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FIELD PRACTICE

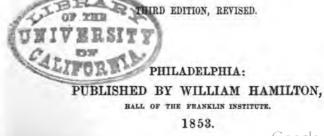
O F

LAYING OUT CIRCULAR CURVES

FOR

RAILROADS.

BY JOHN C. TRAUTWINE,



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Entered according to Act of Congress, in the year 1851, by

JOHN C. TRAUTWINE,

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I have been induced to prepare this little volume almost entirely with reference to the wants of the many young men who desire to qualify themselves for field service in an Engineer Corps. On that account, I have endeavored, by the use of the plainest language, to render the subject intelligible to them,—dispensing with that mathematical brevity which would have better accorded with the requirements of those who have already attained to some degree of proficiency in elementary field operations. Still, I trust that it will not prove unacceptable even to the latter.

The Table of Natural Sines and Tangents to single minutes, in a form sufficiently portable for field use, will supply a want which I have myself frequently experienced, not only in the operation of laying out curves, but on many other occasions.

One object in preparing it, was to furnish the profession with a Table that should be not only portable, but absolutely reliable. Those whose occupations compel them to resort to the Tables in common use, must have frequently experienced, like myself, the extreme embarrassment which attends the inaccuracies to which they are all So long as a Table is known to contain a single error, the position of which is not ascertained, its employment is attended with doubt in every instance in which we are obliged to refer to it. On this account, I have not only prepared these Tables with the most scrupulous care, while in common type, but in order to render their accuracy a matter of certainty, I had them stereotyped, and afterwards revised three times with the utmost caution. I therefore feel no hesitation in saying that they may be depended upon absolutely. The same remark applies to the other Tables contained in the volume.

As Hassler's and Hutton's Tables of Natural Sines and Tangents are those most in use among the profession, it will be desirable to those persons who possess them, to be able to correct the following errors, which I detected in comparing them.

In Hutton's Tables, Fifth Edition, 1811.

Sine of 6° 8′, for ·1063425, read ·1068425. Page 328, at top, for 25 Deg., read 40 Deg. Tangent of 44° 60′, for ·1000000, read 1·000000.

Tangent of 41° 60′, for .8994040, read .9004040.

In Dr. Gregory's Corrected Edition (the 8th) of Hutton's Tables, 1838 Sine of 49° 14', for '7576751, read '7573751.

In Hassler's Tables, 1830.

Sine of 78° 24', read '9795752.

Sine of 20° 60′, " 3583679.

Sine of 66° 19', " '9157795.

Sine of 56° 39', " .8353279.

Sine of 55° 20′, " 8224751.

Sine of 53° 4′, " '7993352.

Sine of 48° 12′. " '7454760.

Sine of 45° 3′. " ·7077236.

The foregoing I believe to be all the errors in the Natural Sines and Tangents to whole minutes, in the respective tables. The discrepancies of 1 in the 7th decimal, I have not considered as errors, as they are occasioned by a neglect of the value of the 8th decimal. For calculating curves, it is not necessary to use more than 4 decimals.

It is scarcely necessary to remark that, beyond 44°, the Sines, Tangents, &c. are read *upwards*, from the bottom of the page, using the corresponding column of minutes. To find the sine of an angle exceeding 90°, subtract the angle from 180°, and take out the sine of the remainder—because the sine of an angle, and that of what it wants of 180°, are the same.

In this edition the Tables of Radii and Ordinates have been extended.

JOHN C. TRAUTWINE.

ERRATA.-None.



IELD PRACTICE

OF

LAYING OUT CIRCULAR CURVES

FOR

RAILROADS.

ARTICLE I.

PRINCIPLES OF LAYING OUT CURVES.

METHOD 1.

To lay out a Curve by means of Tangential Angles.

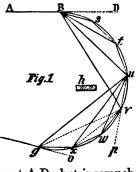
Ir from any point B, fig. 1, in a straight line A D, we

lay off any number of equal angles, as DBs, sBt, tBu, uBv, &c., and at the same time make the chords Bs, st, tu, uv, &c. equal to each other, then the points B, s, t, u, v, &c. will be situated in the circumference of a circle, which is tangential to the line AD at the point B.

The first of these angles, z. DBs, is called the tangential angle, as being that by which

the curve is connected with the tangent AD; but inasmuch as the others are all equal to it, they also are called tangential angles.

If any obstacle, as h, should prevent our seeing from B farther than to v, the curve may be continued by removing



the instrument to u, the point preceding v; thence sighting first on v, continue to lay off additional tangential angles v u w, w u x, &c., as before. Or else, moving the instrument to v itself instead of to u, sight back to u, and lay off first the exterior angle p v w, equal to double the tangential angle, and afterward continue the tangential angles w v x, x v g, &c., as before, to the end of the curve.

Finally, in order to pass from the end of the curve at g, on to a tangent g z, place the instrument at g, and sighting back to x, lay off the tangential angle x g o; then o g continued toward z will be the required tangent. (See Art. IV.)

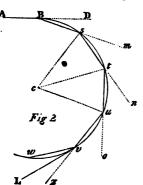
For the tangential angles corresponding to different radii, and chords of 100 feet, see page 25.

ARTICLE II.

METHOD 2.

To lay out a Curve by means of Deflection Angles.

Fig. 2. First, having, as in method 1, laid off a tangen-



tial angle D B s, and measured the chord B s, remove the instrument to the end s of the chord, and make the exterior angle m s t equal to twice the tangential angle, and measure the chord s t; and so on at the other points t, u, v, &c., making each of the exterior angles n t u, o u v, &c. equal to twice the tangential angle, and all the chords equal; then will the points B, s, t, u, v, &c. be in the circumference of a circle which is tan-

gential to the line A D at the point B, as by the first method.

But if, at any of these points, as v, we wish to pass off to a tangent v L, employ at that point the tangential angle z v L, equal to half the deflection angle z v w. (See Art. IV.)

These exterior angles, included between any chord and he extension of the preceding chord, are called deflection

angles, or angles of deflection, or angles of curvature. In any given circle, the angle of deflection is always precisely double the tangential angle, supposing the chords to be equal. At page 25, we give tables of the angles corresponding to circles of different radii, embracing the limits of railroad practice; and calculated for chords 100 feet in length, that being the usual length for a measuring chain on public works.

N. B. The deflection angle of any curve is equal to the angle t c u, or t c s, &c. at the centre of the circle, subtended by one of the equal chords t u or t s. This angle at the centre, so subtended, is called the *central* angle. The tangential angle, being always half the deflection angle,

is, of course, always half the central angle.

ARTICLE III.

METHOD 3.

To lay out a Curve by Eye.

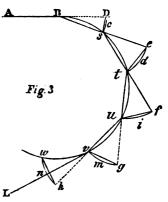
The deflection angles, fig. 3, est, ft u, g u v, h v w, &c., being double, the tangential

being double, the tangential angle D B s, the arcs e d t, f i u, g m v, h n w, &c., are double the arc D c s, since the arcs of circles are proportionate to the angles which they subtend; but the chords e t, f u, g v, h w, &c. are not double the chord D s, since the chords of arcs are not proportionate to the arcs, or to the angles which they subtend.

The chords e t, f u, g v, h w, &c., which subtend the L deflection angles, are called

deflection distances; and the chord D s, which subtends the tangential angle, is called the tangential distance.

But although, in any given circle, the deflection distance is not truly twice the tangential distance, yet the difference



is so trifling in large railroad curves, with chords of but 100 feet, that it may generally be neglected in curves of more than 300 feet radius.

In our tables the *precise* length of both will be found for different radii, and for chords of 100 feet.

Having these respective distances, we may frequently trace a curve on the ground by the eye only, with very tolerable accuracy, sufficient for guiding the excavations and embankments, especially on nearly level ground. Suppose, for instance, it be required to lay out in this manner a curve of 5730 feet radius.

First, find by the table, page 25, or by Art. XVI, the deflection distance et or fu, &c., corresponding to a radius of 5730 feet for a chord of 100 feet, viz. 1.745 feet; and also the tangential distance ds 873 of a foot.

Then from the starting point B, and in line with AB, measure BD equal 100 feet; and put a pin at D. Also from B, measure the chord Bs, equal 100 feet; at the same time measuring with a graduated rod, from the pin D, the tangential distance Ds, equal to .873 of a foot; and place a stake at s. The pin at D may then be removed.

Next, make se equal 100 feet, placing a pin at e, precisely in line with sB; also from s measure st equal 100 feet; at the same time measuring with the rod from the pin e, the deflection distance et, equal to 1.745 feet. Place a stake at t, and remove the pin at e. In this manner proceed to find other points as far as the end of the curve at v.

In order to pass from the curve, as at v, to a tangent v L, proceed as before, only using the tangential distance h n, instead of the deflection distance h w. (See Art. IV.)

This method is abundantly accurate for laying out curves on a canal, or common road; and will occasionally answer very well, when carefully performed, for railroad curves, in the absence of an instrument. Thin straight rods, ironpointed, and a plumb line should be used for ranging the points in the latter case.

The transit instrument is the best for tracing curves, and running lines generally. I prefer the graduations to run from the same zero, right and left, to 180° each way. There should be two verniers, graduated to minutes; by their means half, or even quarter minutes may generally be estimated with considerable certainty. The telescope revolving in a vertical plane, greatly expedites the laying off of exte-

rior angles, after having first sighted backward to the point behind.

The verniers are sometimes graduated to hundredths of a degree; and this division is, in certain cases, the best; but for *general* purposes, the division into minutes is to be preferred, as all the printed tables of sines, tangents, &c., are calculated for that division.

ARTICLE IV.

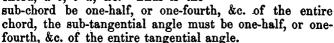
On Sub-Chords.

We have hitherto spoken of curves as if they were composed of equal chords, each of 100 feet in length. It frequently happens, however, that at the end of a curve, as

at e, fig. 4, we are obliged to use a shorter, or sub-chord d e, in order to unite properly with the tangent

e f.

In that case, and when using Method 1., Art. I., of laying off curves by means of tangential angles, we must, in order to fix the point e, lay off a sub-tangential angle dA e, as much smaller than the entire tangential angle BA c, or cAd, &c., as the sub-chord de is smaller than an entire 100 feet chord, a c, cd, &c. Thus if the

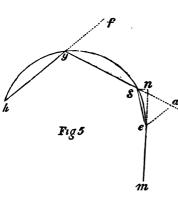


This method is not mathematically exact, for the reason stated in Art. III. (viz. that the *chords* subtending different angles are not proportional to those angles;) yet, for curves of 300 or more feet radius, and with chords not exceeding 100 feet in length, the error is not observable in practice.

In like manner, when we pass off from a sub-chord, as at e, to a second tangent, e f, we must place the instrument at e, and lay off the same sub-tangential angle d e g; or which is better, take sight from e to e, and lay off the angle e e g, equal to the e1 angential and the sub-tangential angle.

But when using Method 2, Art. II. of deflection angles, or Method 3, Art. III. of deflection distances, we may calculate the sub-deflection angle, a s e, fig. 5, and sub-deflection distance a e, formed between a sub-chord s e, and the extension s a, of an entire chord g s, with sufficient accuracy for curves of 300 or more feet radius, and chords of not more than 100 feet, thus:

Rule.—Say, as an entire chord of 100 feet is to the subchord se, so is the deflection angle of the curve, to a certain angle. Add these two angles together and divide their sum by 2, for the sub-deflection angle a se, of the sub-chord.



Example.—The curve, fig. 5, has a radius of 319.6 feet, and an angle of deflection, f g s, of 18° for chords of 100 feet. The sub-chord s e is 25 feet in length; what is the sub-deflection angle a s e; and also the sub-deflection distance a e, for the sub-chord s e?

chord se?

Chord. Sub-Chord.

Here, as 100 is to 25,

Def. An. of Certain Angle.

So is 18° to 4° 30′.

The sum of these two angles, 18° and 4° $30' = 22^{\circ} 30'$, the half of which is 11° 15', the required sub-deflection angle $a \ e$.

Again, to find the sub-deflection distance a e, of the sub-chord s e; take from the table of sines, the natural sine of one-half the sub-deflection angle a s e, just found. Multiply this natural sine by 2, and multiply that product by the length of the sub-chord.

Example.—The sub-deflection angle is 11° 15'; one-half of it is 5° $37\frac{1}{2}$ ', the tabular natural sine of which is .0979, which multiplied by 2, gives .1958; and this multiplied by the sub-chord, 25 feet, gives 4.895 feet, the required sub-deflection distance a e.

Finally, to find the sub-tangential distance s n, by means of which to pass from e to the tangent e m, say, as 10000

is to the square of the sub-chord in feet; so is the tangential distance for a 100 feet chord, to s n. In this instance, we have as 10000 is to 625, so is 15.69 feet to .980 feet, or s n.

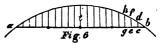
ARTICLE V.

Ordinates for Entire Chords.

It would be both tedious, and liable to inaccuracy, to attempt to fix all the necessary points in railroad curves by the foregoing means, which are employed only for entire chords, or for such sub-chords as may be required at the ends of curves.

The best method is to stretch a piece of twine a b, fig. 6,

100 feet long, between two adjacent chord-stakes, and measure off as nearly as may be at right angles to it, with a graduated rod, the previously



calculated ordinates, c d, e f, g h, &c., placing pegs at d, f, h, &c.* Our table of ordinates, page 28, is calculated for distances apart b c, c e, e g, &c., of 5 feet; and for all curves likely to occur in practice. The 5 feet distances on the twine should be marked by knots or otherwise; and those at the center, and half way between it and the ends, be further distinguished by tying on pieces of tape.

The 5 feet distances are only used (after the excavations and embankments are finished) for placing pegs to guide the laying of the rails, and then only for very sudden curves; for those of large radii, distances of 10 feet are quite sufficient, or even 25 feet for very easy curves. For guiding the curves of the cuttings and fillings, it is not necessary to place the stakes nearer than 50 feet apart; unless for those of less than about 1000 feet radius, when they may be placed 25 feet apart. Ordinates for radii intermediate of those in the table, may either be calculated by the rules given further on; or they may be taken proportionally intermediate of the tabular ones, with sufficient accuracy for practice.

Ordinates for Sub-Chords.

These may readily be calculated approximately enough

^{*} On the tops of these stakes, small tacks are driven to define the precise point in the curve.

for railroad practice, for curves of over 300 feet radius, and for chords not exceeding 100 feet, thus: In a circle of given radius, not less than about 300 feet, the ordinates of an entire 100 feet chord may be assumed to be to those of a sub-chord, as the square of the chord is to the square of the sub-chord.

In all our tables the chord is supposed to be 100 feet, the square of which is 10000; the rule therefore becomes, as 10000 feet: to square of sub-chord in feet; Ord. of

Chord: Ord. of Sub-chord approximately.

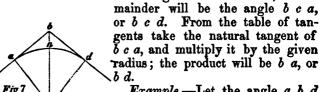
Example.—In a curve of 5730 feet radius, the middle ordinate of a 100 feet chord is 218 of a foot; what will be the length of the middle ordinate of a sub-chord of 50 feet? Here,

And so of any other ordinate, always supposing the chord and sub-chord to be divided into the same number of parts.

ARTICLE VI.

Having given the angle a b d, fig. 7, it is required to find the point a or d, at which to commence a curve of given radius.

Rule.—Subtract half the angle a b d from 90°; the re-



Example.—Let the angle a b d be 120°, how far from b must we begin, at a or d, to lay out a curve

and, of 2865 feet radius?

Here, half of the angle a b d = 60° , which taken from 90° leaves the angle b c a = 30° . The natural tangent of 30° = $\cdot 5773$, which multiplied by the radius of 2865 feet, gives $1653\cdot 96$ feet for b a or b d. (See Art. XII.)

ARTICLE VII.

Having given the angle a b d, fig. 7, and the distance from b to a or d, at one of which we wish to commence a curve, it is required to find what radius a c or c d, the curve must have, in order to unite with b a and b d tangentially at a and d.

Rule.—Subtract the angle a b c, which is half the angle a b d, from 90°; the remainder will be the angle b c a, or b c d. Then as nat. sine of b c a,* is to nat. sine of a b c,† so is a b to a c, the radius required.

Example.—Let the angle a b d be 120°, and the distance b a or b d 1654 feet; what will be the radius a c or

c d of a circle that shall touch a and d tangentially.

Here the angle a b c = half the angle a b d, is 60°, which taken from 90°, leaves the angle b c a, or b c d =30°. Then as the nat. sine of $b c a(30^\circ) = .5000$ is to nat. sine of a b c, $(60^\circ) = .8660$, so is b a (1654 feet) to ac, (2865 feet,) the radius required.

ARTICLE VIII.

Having given the radius a 0, fig. 7, of a curve, and the angle a b d, it is required to find the number of chords of 100 feet that will constitute the curve.

Rule.—Subtract the angle a b d from 180°, and divide the remainder by the angle of curvature, or deflection of the curve. The quotient will be the required number of chords.

Example.—Let the angle a b d be 120°, and the radius a c, 2865 feet.

Here the angle a b d, 120°, subtracted from 180°, leaves a remainder of 60°; which, divided by 2°, the angle of deflection for a curve of 2865 feet, gives a quotient of 30; which is the required number of chords of 100 feet.

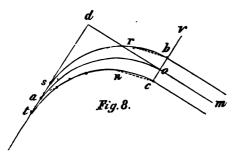
N. B.—Had the quotient contained a fraction of a chord, it would have indicated that we should have had to employ a sub-chord at the end of the curve; for instance, had the number of chords been 301, a sub-chord of 50 feet (very approximately) would have been necessary.

^{*} The angle opposite the given side, a b. † The angle opposite the required side, a coogle

ARTICLE IX.

How to proceed when the end of a curve does not correctly join the tangent.

We sometimes find, in running out a curve for the number of chords determined by the Rule in the preceding Article, that instead of uniting as it should with the previously determined tangent d m, fig. 8, at o, it ends tangentially to a line parallel to said tangent, either within it, as at c; or beyond it, as at b. Being first certain that no error has occurred in tracing out the curve, ascertain with the compass the bearing of the tangent a d, and, removing the compass to the end of the curve at c or b, (as the case may be,) run the line b o or c o, in the same course as a d, until it strikes the tangent d o m; which may be ascertained by ranging two stakes placed on the tangent.



Then measure b o, or c o, (as the case may be,) and if the curve fall within the tangent o m, as at c, measure forwards from t towards d, the distance t a, equal to c o; or if the curve fall beyond the tangent, as at b, measure backwards from s, the distance s a equal to b o. Then the curve retraced from a, will terminate tangentially in d m at o.

N. B.—The direction of co or bv may be ascertained without a compass, and better, thus: Multiply the tangential angle of the curve by twice the number of chords run, less one; subtract the product from 180°, and sighting back one chord to n or r, lay off the angle n c b, or r b v, equal to the remainder. For example, if the tangential angle be r0°, and from t to c be 4 chords, then 7 times r0° taken

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from 180° leaves the angle n c b, or r b v = 110°. When the product exceeds 180°, it must be subtracted from 360°, for the angle n c b, or r b v.*

This case occurs whenever an error has been made in measuring the distance from d to a. If d a be made too short, the curve s b is the result; and if too long, the curve t c.

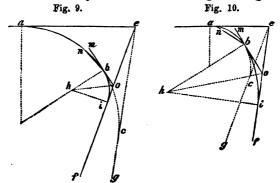
If the error is small, it may be divided equally among the chords by measure, without retracing the curve with an instrument. This method may be employed with perfect security so long as the error does not exceed 1 foot to every chord of 100 feet; and it will never be so great if moderate care be taken.

Thus, if the curve be 20 chords long, and the error 20 feet, the last stake may be moved 20 feet, the next 19, the next 18, &c., as nearly at right angles to the curve as can be judged by the eye.

The same ordinates that would have been used had the curve been correct, will answer for the one so adjusted, without perceptible difference. For other cases, see Art. X.

ARTICLE X.

Again, it may happen that the error is not caused by a mismeasurement of the distance a e, figs. 9 and 10, as in the last case; but by mistake in obtaining the angle a e f.



If a e f, fig. 9, be measured in excess, as a e g, then the

^{*} In both cases the angle is measured outwardly from the curve; but when the curve falls beyond the tangent, as at b, then b v must be continued inwardly as b o.

curve a b c, calculated for the incorrect angle a e g, will be found to fall beyond the true tangent e f, as at c; and the tangents e g and e f not being parallel, the curve cannot be adjusted by either of the methods given in the preceding Article, unless the error be within about 1 foot to each 100 feet length of the curve; in which case, (supposing no other error to exist,) either of those methods may be employed, with sufficient accuracy for practice.

Also, if a e f, fig. 10, be measured too small, as a e g, then the curve a b c, calculated for the incorrect angle a e g, will be found to fall within the true tangent e f, as at c; when so, the remarks contained in the preceding sentence are equally applicable here. If the error be within 1 foot to 100 feet length of curve, it may be equally divided among the chords. But if greater, we must either remeasure the angle a e f correctly, and go over the whole work again, or resort to some other mode of obviating the difficulty. The angle a e f may be difficult of access; or the curve may be so long that to retrace it would be a work of much labor. We may then adopt the method of compound curves, (see Art. XIII.,) by which much trouble will be avoided, and a considerable portion of the first part of the curve be allowed to remain as it is.

Thus, whether the curve a b c fall beyond the true tangent e f, as in fig. 9, or inside of it, as in fig. 10, place the instrument at b, figs. 9 and 10, (the point at which the change of radius is to take place,) and sighting back one chord to n, lay off the tangential angle n b m of the curve a b c, and observe where the tangent m b continued, strikes e f, as at o. Measure both b o, and the angle b o f. Half the angle b o f taken from 90°, gives the angle b h o; then say,

So is The given side bo, to The required side, or new radius b &.

Ascertain from the table, or by calculation, the angle of deflection, and the tangential angle corresponding to this new radius b h; and the new curve commencing at b will terminate tangentially to e f at i, as far from o as o is from b.

For the mode of uniting two curves of different radii, so

as to form a compound curve, see Article XIII.

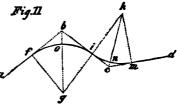
It will be observed, that when the first curve, a b c, fig. 10, falls inside the tangent e f, the new curve must be of greater radius; and when beyond fig. 9, of a less one.

ARTICLE XI.

Having given the angles a b c and b c d, fig. 11, and the distance b c, it is required to find the greatest radius, g i, or h i, that can be employed in a REVERSE curve, (see Article XIV) f o i n m, for uniting a b to c d.

Rule.—Half the angle a b c taken from 90°, leaves the angle b g i; and half the angle b c d taken from 90°, leaves the angle i h c.

From the table of tangents take the natural tangent (bi) of the angle bgi; and that (ic) of the angle ihc; and add them together.



Then as the sum of these two nat. tangents is to the nat. tang. of bg i, so is bc to bi; and bi taken from bc, gives ic.

Again, in the triangle bgi, as the nat. sine of the angle bgi, opposite the given side bi, just found, is to the nat. sine of the angle gbi, opposite the required side gi, so is bi, the given side, to gi, the required side or radius.

Example.—Let the angle a b c be 71° 40′, the angle b c d 129° 15′, and the distance b c 950 feet. What is the length of radius h i or g i, of the easiest reverse curve that can be traced for uniting a b to c d?

Here, half the angle a b c (35° 50′) taken from 90°, leaves the angle b g i 54° 10′; and half the angle b c d (64° 37½′) taken from 90°, leaves the angle i b c = 25° 22½′.

From the table of tangents, we have nat. tang. of b g i (54° 10') = 1.3848; and nat. tang. of i h c (25° 22½') = 4743; their sum being 1.8591.

Then as

Sum of Tang's.
$$\begin{cases} 1.8591 \end{cases}$$
 is to $\begin{cases} \frac{1}{54} \cdot 10' \\ 1.3848, \end{cases}$ so is $\begin{cases} \frac{b}{50} \cdot \frac{c}{61}, \\ \frac{c}{50} \cdot \frac{c}{61}, \end{cases}$ to $\begin{cases} \frac{b}{50} \cdot \frac{c}{61}, \\ \frac{c}{50} \cdot \frac{c}{61}, \\ \frac{c}{50}$

and b i, 707.63 feet, taken from b c, 950 feet, leaves i c 242.37 feet.

Again, as the

Nat. Sine of angle b g i angle g b i angle g b i so is
$$\begin{cases} Nat. & \text{sine of } \\ Angle & g & b \\ -5854, \end{cases}$$
 so is
$$\begin{cases} b & i \\ 707.63 \\ \text{feet} \end{cases}$$
 to
$$\begin{cases} g & \text{for } k \text{ is, the } \\ \text{required radius, } 510.97 \\ \text{feet.} \end{cases}$$

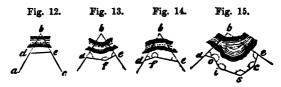
ARTICLE XII.

To obtain the angle d b e, formed by two tangents, d b, and b e, when the point b is inaccessible. Figs. 12, 13, 14, and 15.

This is of frequent occurrence.

CASE 1. When the included figure, fig. 12, has but three sides.

Rule.—Subtract the angle a de from 180° for the angle b de; and subtract the angle dec from 180°, for the angle deb. Add together b de and deb, and subtract their sum from 180°, for the angle dbe.



CASE 2. When the included figure, d b ef, figs. 13 and 14, has four sides.

Rule.—Subtract the sum of the three internal angles of the figure marked by dotted segments of circle, from 360° , for the angle d b e.

CASE 3. When the included figure, 15, has more than four sides.

Rule.—Add together all the internal angles, marked by dotted segments of circles; and subtract their sum from twice as many right angles as the figure has sides, less four, for the angle d b e.

Example.—Let the angles denoted by the dotted segments at the different letters be as follows: That at d, 70°; at e, 220°; at i, 150°; at s, 110°; at c, 160°; at e, 100°. The sum of these is 810°. The figure has 7 sides; and twice 7, less 4 = 10; and 10 right angles = 900°; from which the sum of the designated internal angles (810°) being subtracted, leaves 90°, for the angle d b e.

N. B.—When the angle d be has to be deduced from a figure of many sides, as fig. 15, the errors spoken of in Articles IX. and X. are apt to occur, unless the several sides and the angles o, i, s, &c., be measured with much care. For tracing curves with any accuracy and satisfaction, the instrument should be divided at least into minutes; as before remarked, the transit instrument is the best for the purpose. With moderate care in the preparatory measurement of the sides and angles, errors will seldom occur that may not be adjusted with all the accuracy required in practice, by the very simple method of dividing them equally among the chords, as explained in Articles IX. and X.

ARTICLE XIII.

To pass from one curve, a m b, fig. 16, to another, b n c, of different radius, but running in the same direction, constituting a COMPOUND curve.

Rule.—Placing the instrument at b, sight back to the other end of the 100 feet chord at a; and lay off the tangential angle a b d, of the curve a m b; then from the common tangent d b e, lay off the tangential angle e b c, of the curve b n c, making at the same

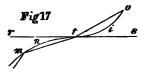
N. B.—If running the curve by eye, use the tangential distances instead of the angles.

time the chord b c equal to 100 feet.

ARTICLE XIV.

To pass from one curve, m n t, fig. 17, to another, t i o, of either the same, or of a different radius, but running in an opposite direction; constituting a REVERSE curve.

Rule.—Placing the instrument at t, sight back to the



other end of the 100 feet chord at m, and lay off the tangential angle m t r, of the curve m n t; then from the common tangent r t s, lay off the tangential angle s t o, of the curve t i o; making at the same time the chord t o,

equal to 100 feet.

N. B.—If running the curve by eye, use the tangential distances instead of the angles.

ARTICLE XV.

RADII.

To find the radius corresponding to any given angle of deflection, and to equal chords of any given length.

Rule 1.—Subtract the angle of deflection from 180°, then say, as nat. sine of angle of deflection, is to nat. sine of half the remainder, so is the given chord to the radius required.

Example.—Let the angle of deflection be 2°, and the chord 100 feet, required the radius.

Here 2° subtracted from 180°, leaves 178°, the half of which is 89°, and as

Nat. Sine of 2° ... Nat. Sine of 89° ... Chord ... Radius ... 100 feet ... 2865 feet.

Rule 2.—The radius for 100 feet chords may be found approximately, by dividing 5730 by the deflection angle.

This rule is very close for radii of not less than 500 feet. For 500 feet it gives eight-tenths of a foot too little, but is more approximate for larger radii.

Example.—What is the radius to a deflection angle of

2°, the chords being 100 feet long?

Here, 5730 divided by 2, gives 2865 feet, the radius required.

ARTICLE XVI.

TANGENTIAL AND DEFLECTION ANGLES.

To find either the Tangential or Deflection Angle corresponding to any given radius, and to equal chords of any given length.

Rule 1.—Divide kalf the chord by the radius; the quotient will be the natural sine of the tangential angle. Therefore, the angle corresponding to this sine, in the table of natural sines, will be the tangential angle required; and the tangential angle multiplied by 2 will give the deflection angle.

Example.—Let the radius be 2865 feet, and the chord 100 feet; what will be the tangential and deflection angles?

Here, half the chord, (50 feet,) divided by the radius, (2865 feet,) gives ·01745; and the tangential angle in the table corresponding to the natural sine ·01745 is 1°, twice which is 2°, the deflection angle required.

Rule 2.—The deflection angle for 100 feet chords may be found approximately by dividing 5730 by the radius. This is very close for curves of over 500 feet radius. For 500 feet it gives about one minute too little.

Example.—What is the deflection angle for a radius of

2865 feet, the chords being 100 each?

Here, 5730 divided by the radius 2865, gives 2°, the deflection angle required.

ARTICLE XVII.

DEFLECTION DISTANCES.

To find the Deflection Distance (exactly) for any given radius, when the chords are 100 feet long.

Rule.—Divide the constant number 10000 by the radius in feet; the quotient will be the deflection angle required.*

Example.—What is the deflection distance to a radius

of 5730 feet, the chords being 100 feet long?

Here, 10000 divided by 5730 radius, gives 1.745 feet, the deflection distance required.

To find the Deflection Distance for any given radius, and for equal chords of any given length.

Rule.—Divide half the given chord by radius, the quotient will be the natural sine of one-half the deflection angle; and double this natural sine, multiplied by the chord, will give the deflection distance required. By this rule our table was prepared.

Example.—As before, what is the deflection distance to

a radius of 5730 feet, the chords being 100 feet long?

Here, half the chord, (50 feet,) divided by radius, (5730 feet,) gives '008727, which is the natural sine of half the deflection angle. Now '008727, multiplied by 2, gives '017454, which, multiplied by the chord, (100 feet,) gives 1.745 feet, the required deflection distance, the same as in the preceding example.

ARTICLE XVIII.

TANGENTIAL DISTANCES.

To find the Tangential Distance corresponding to any given radius, and to equal chords of any given length.

Rule.—First find the tangential angle by Article XVI., and take from the table of natural sines, that correspond-

^{*} Because the deflection distance to a radius of 10000 feet, with chords of 100 feet, is 1 foot; and the deflection distances for other radii increase inversely as the radii.

ing to one-half of the tangential angle. Then multiply double this sine by the given chord, for the tangential distance. By this rule our table was prepared.

Example.—Let the radius be 2865 feet, and the chords 100 feet each; what will be the tangential distance?

Here we find, by Article XVI., the tangential angle 1°

for a radius of 2865 feet.

The natural sine corresponding to 30 minutes, or one-half of this tangential angle, is, by the table of sines, ·008727; the double of which is ·017454, which, multiplied by the chord, or 100 feet, gives 1.745 feet for the tangential distance required.

ARTICLE XIX.

ORDINATES.

To find the Middle Ordinate to any given radius, and to any given chord.

Rule 1.—From the square of the radius subtract the square of half the chord; and take the square root of the remainder from the radius, for the middle ordinate.

Example.—What is the length of the middle ordinate de, fig. 18, the radius ca being 819 feet, and the chord ab 100 feet?

Here, the square of c a (819) is 670761, and the square of a e (50) is 2500; which, being subtracted from the former, leaves 668261; the square root of which is e c, 817.472; which, taken from the radius 819, leaves 1.528 feet, the required middle ordinate, d e.

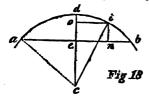
Rule 2.—Subtract the tabular cosine of the tangential angle from 1, and multiply the remainder by the radius.

Example.—Same as foregoing, namely, radius 819 feet, angle of deflection 7°, to chords of 100 feet. What will be the length of the middle ordinate?

Here, tabular cosine of $3\frac{1}{2}$ ° (the tangential angle) is 998135; which, subtracted from 1, leaves 001865; which, multiplied by 819, the radius, gives 1.527, the middle ordinate required.

ARTICLE XX.

Having given the Middle Ordinate de, fig. 18, it is required to find any other one, as in.



Rule 1.—Subtract the middle ordinate de, from the radius de, the remainder will be ee: then from the square of the radius ee i, subtract the square of the distance ee i, which the required ordinate e in is from the middle

ordinate de, and extract the square root of the remainder. This square root will be oc. From this square root oc, subtract ec; the remainder will be oe, which is equal to in, the required ordinate.

Example.—The middle ordinate de, of a 100 feet chord ba, to a radius of 819, being 1.528 feet, it is required to find the length of the ordinate in, 20 feet from the middle one.

Here, the middle ordinate de, 1.528, subtracted from the radius 819, leaves ec, 817.472. The square of the radius is 670761; and the square of 20 (the distance of the required ordinate from the middle one) is 400; which taken from 670761, leaves 670361; the square root of which is 818.756, or oc; from which take ec, or 817.472, and the remainder, 1.284, will be oe, which is equal to in, the required ordinate.

Rule 2.—Multiply the ordinates of a 1° curve by the deflection angle of the curve whose ordinates are required, (chords being 100 feet.) This is a sufficiently close approximation for curves of not less than 500 feet radius; and for placing ordinates for guiding the excavations and embankments, it is close enough for the smallest curves in our table.

TABLE OF RADII, &c.—Chord 100 FEET.

The Tangential Angle is always one-half of the Angle of Deflection.

Angle of Deflection.	Radius in feet.			Angle of Deflection.	Radius in feet.	Deflection distance in feet.	Tangential distance in feet.	
0 !				0 /				
1	343800	.029	·014	44	7814	1.279	•689	
2	171900	-058	029	45	7640	1.808	·65 4	
8	114600	∙087	∙048	46	7474	1.337	•668	
4	85950	•116	· 0 58	47	7815	1.866	.683	
5	68760	·145	-072	48	7162	1.395	·697	
6	57800	·174	-087	49	7016	1.424	.712	
7	49116	.203	•101	50	6876	1.458	·726	
8	42975	•232	·116	51	6741	1.482	.741	
9	38200	•262	•131	52	6611	1.511	.755	
10	84380	.291	·145	58	6487	1.540	.770	
11	81256	·320	·160	54	6867	1.569	.784	
12	28650	·849	174	58	6251	1.598	.799	
13	26446	·378	·189	56	6139	1.627	·813	
14	24558	·407	•203	57	6032	1.656	-828	
15	22920	-436	•218	58	5928	1.685	-842	
16	21487	·465	.232	59	5827	1.715	-857	
17	20224	494	.247	i	5780	1.745	.872	
18	19100	.523	.261	2	5545	1.802	901	
19	18094	.552	•276	4	5372	1.860	.930	
20	17190	-581	290	6	5209	1.918	.959	
21	16872	·610	-305	8	5056	1.976	988	
22	15628	-639	∙319	10	4912	2 036	1.018	
23	14948	-668	-884	12	4775	2.094	1.047	
24	14825	-697	848	14	4646	2.152	1.076	
25	18752	.727	-363	16	4524	2.210	1.105	
26	13223	756	-378	18	4408	2.268	1.184	
27	12733	·785	-392	20	4298	2.826	1.168	
28	12279	-814	407	22	4198	2.884	1.192	
29	11856	-843	421	24	4093	2.443	1.221	
80	11460	-872	·436	26	8998	2.501	1.250	
81	11090	900	450	28	3907	2.559	1.279	
82	10744	.980	•465	80	8820	2.617	1.308	
83	10419	.959	·479	82	8620 8787	2.676	1.338	
84	10112	-988	•494	84	8657	2.734	1.367	
85	9823	1.017	•508	86	8581	2.784	1.896	
86	9550	1.017	•508	86 88	8508	2.798		
87	9292	1.046				2.801	1.425	
88			537	40	3438		1.454	
89	9047	1.104	-552	42 44	8870	2.967	1.483	
89 40	8815	1.188	566		8306	8.025	1.512	
	8595	1.162	•581	46	8243	3.083	1.541	
41	8385	1.191	-595	48	8183	3.141	1.570	
42	8186	1.221	·610	50	8126	8.199	1.599	
43	7995	1.250	·625	52	8069	3.258	1.629	

TABLE OF RADII, &c.—Chord 100 Feet. Continued.

The Tangential Angle is always one-half of the Angle of Deflection.

Angle of Deflection.	Radius in feet.	Deflection distance in feet.	Tangential distance in feet.	Angle of Deflection.	Radius in feet.	Deflection distance in feet.	Tangential distance in feet.
0 /				0 '			
1 54	3016	3.316	1.658	3 20	1719	5.817	2.908
56	2964	3.374	1.687	22	1702	5.875	2.937
58	2914	3.432	1.716	24	1685	5.933	2.966
3 "	2865	3.490	1.745	26	1669	5.992	2.996
2	2818	3.548	1.774	28	1653	6.050	3.025
4	2772	3.606	1.803	30	1637	6.108	3.054
6	2729	3.665	1.832	32	1621	6.166	3.083
8	2686	3.723	1.861	34	1606	6.224	3.112
10	2644	3.781	1.890	36	1591	6.282	3.141
12	260 4	3.839	1.919	38	1577	6.340	3.170
14	2566	3.897	1.948	40	1563	6.398	3.199
16	2528	3.956	1.978	42	1549	6.456	3.228
18	2491	4.014	2.007	44	1534	6.515	3.257
20	2456	4.072	2.036	46	1521	6.574	3.287
22	2421	4.130	2.065	48	1508	6.632	3.316
24	2387	4.188	2.094	50	1495	6.690	3.345
26	2355	4.246	2.123	52	1482	6.748	3.374
28	2323	4.305	2.152	54	1469	6.806	3.403
30	2292	4.363	2.182	56	1457	6.864	3.432
32	2262	4.421	2.210	50	1445	6.922	3.461
34	2232	4.479	2.239	4 00	1433	6.980	3.490
	2204	4.538	2.269	± 5	1403	7.125	3.562
36	2176	4.596	2.298	10	1375	7.270	3.635
38			2.326	15	1348	7.416	3.708
40	2149	4.653		20		7.410	3.781
42	2122	4.712	2.356	20 25	$1322 \\ 1298$		3.854
44	2096	4.770	2.385			7.708	
46	2071	4.828	2.414	30	1274	7.853	8.927
48	2046	4.886	2.443	35	1251	7.998	3.999
50	2023	4.944	2.472	40	1228	8.143	4.071
52	1999	5.002	2.501	45	1207	8.289	4.145
54	1976	5.060	2.530	50	1185	8.432	4.216
56	1953	5.118	2.559	§ 55	1166	8.577	4.288
3 58	1932	5.176	2.588		1146	8.722	4.361
	1910	5.235	2.618	5	1127	8.869	4.434
2	1889	5.293	2.646	10	1109	9.014	4.507
4	1868	5.351	2.675	15	1092	9.159	4.579
6	1848	5.409	2.704	20	1074	9.304	4.652
8	1828	5.468	2.734	25	1058	9.449	4.724
10	1810	5.526	2.763	30	1042	9.595	4.798
12	1790	5.584	2.792	85	1026	9.740	4.870
14	1772	5.642	2.821	40	1011	9.885	4.942
16	1754	5.700	2.850	45	996.8	10.03	5.015
18	1736	5.758	2.879	50	982.7	10.18	5.090
				50	982.7		5.090

TABLE OF RADII, &c.—CHORD 100 FRET. CONTINUED.

The Tangential Angle is always one-half of the Angle of Deflection.

Angle of Deflection.	Radius in feet.	Deflection distance in feet.	Tangential distance in feet.	Angle of Deflection.	Radius in feet.	Deflection distance in feet.	Tangential distance in feet.
0 /				0 /			
5 55	969.0	10.32	5.160	12 30	459.3	21.79	10.90
6	955.4	10.47	5.235	13 45	450.3	22.21	11.12
5	947.5	10.62	5.310		441.7	22.64	11.34
10	939.7	10.76	5.380	15	433.4	28.07	11.56
15	917.0	10.90	5.450	30	425.5	23.51	11.77
20	905.0	11.04	5.520	o 45	417.7	23.94	11.99
25	893.5	11.20	5.600	14	410.8	24.37	12.21
30	882· 0	11.34	5.670	15	403.1	24.81	12.43
35	870.7	11.48	5.740	30	$396 \cdot 2$	25.24	12.65
40	859.5	11.63	5.815	o 45	889.6	25.67	12.86
45	849.3	11.78	5.890	15	383.1	26.11	13.08
50	838.9	11.92	5.960	15	876.9	26.52	18.30
$\stackrel{55}{7}$	828.9	12.06	6.030	30	870.8	26.94	13.52
* 1	819.0	12.21	6.105	6 45	365·0	27.37	18.73
5	813.3	12.36	6.180	16	859.3	27.83	18.95
10	807.4	12.50	6.250	80	348-4	28.70	14.38
15	790.8	12.64	6.320	17	838.8	29.56	14.82
20	781.9	12.79	6.395	80	328.7	30.43	15.25
25	773.2	12.94	6.470	18	319.6	81.29	15.69
80	764.5	18.08	6.540	, 30	811.0	82.15	16.12
85	756·1	13.22	6.610	19 30	802.9	33 ⋅01	16.56
40	748.0	18.87	6.685	. 80	295.3	83.87	16.99
45	739.9	18.51	6.755	20 30	287.9	34.73	17.43
50	732.0	13.66	6.830	21	274.4	36.44	18.30
55	724.3	13.80	6.900	22	262.0	38.15	19.17
8	716.8	13.95	6.975	23	250.8	39.87	20.02
15	695.1	14.38	7.190	24	240.5	41.58	20.91
80	674.6	14.81	7.405	25	231-0	43.28	21.77
o 45	655.5	15.25	7.625	26	222.3	44.98	22.64
8 3	637.3	15.68	7.840	27	214.2	46.68	23.51
15	620.2	16.12	8.060	28	206.7	48.38	24.37
30	603.8	16.55	8.275	29	199.7	50.07	25.24
o 45	588-4	16.99	8.495	30	193.2	51.76	26.11
10	573.7	17.48	8.715	81	187-1	53.45	26.97
15	559.7	17.87	8.935	82	181.4	55.18	27.83
30	546.4	18.30	9.150	33	176.0	56.80	28.70
o 45	538.8	18.73	9.365	34	171-0	58.47	29.56
ıı 10 11 11 11 11 11 11 11 11 11 11 11 11	521.7	19.17	9.585	85	166.3	60.14	30.42
15	510.1	19.61	9.805	86	161.8	61.80	81.29
80	499-1	20.05	10-03	87	157.6	63.46	82.15
o 45	488.5	20.50	10.25	38	153.6	65.11	33.01
12	478.3	20.94	10-47	89	149.8	66.76	33.87
15	468.7	21.86	10-69	40	146.2	68-40	84.73

TABLE OF ORDINATES.

Ordinates five feet apart.—Chord one hundred feet.

Distances of the Ordinates from the end of the 100 feet Chord.										
Angle of Deti'n.	Middle, 50 feet.	45 feet.	40 feet.	35 feet.	30 feet.	25 feet.	20 feet.	15 feet.	10 feet.	5 feet.
。 ,	I									
2	-007	∙007	∙007	∙006	.006	∙005	.003	-003	-002	·001
4	-014	014	·014	.013	·012	∙010	∙008	-008	·005	.003
6	•021	.021	∙021	⋅020	-019	·016	.013	-011	·008	·004
8	-029	•029	⋅028	.026	.024	.022	-018	-015	-010	·005
10	∙036	.036	·035	·033	. •031	·027	.023	·019	·013	.007
12	.043	-048	∙041	-038	·037	.033	·028	.022	·015	.008
14	·050	∙050	∙048	∙044	·043	.038	.032	-026	·017	·010
16	-058	· 0 58	-056	-052	·049	.044	-037	.030	·020	·011
18	∙065	-065	·063	∙059	·055	∙050	·042	.033	·028	·013
20	.073	.072	∙070	∙066	· 0 61	·055	-047	∙037	·026	·014
22	-080	.079	.076	.071	·067	·060	·051	.041	.029	·015
24	-087	-086	·083	.077	.074	·066	.056	.045	-031	·017
26	-094	.093	∙090	-084	-080	-071	-060	-048	-034	-018
28	.102	·101	-098	.092	·086	-077	·065	.052	.036	-019
80	.109	-108	·105	-099	.092	-082	∙070	.055	-039	.020
82	.116	.115	.112	·106	.098	·088	∙075	∙058	.042	-022
34	.123	·122	118	·111	·104	-094	.079	.062	.044	-028
86	.131	·130	.126	·119	·110	-099	-084	.066	.047	-024
88	.138	.137	.133	.126	·116	·105	·089	.070	.049	.025
40	.145	.144	·140	.133	.123	·110	.098	-074	.052	.027
42	.152	·150	.146	·138	.128	·115	-098	-077	.055	.028
44	.160	·158	.158	.145	·185	·121	.103	-081	-057	-030
46	-167	.165	.160	.152	·141	·126	.107	085	-060	-032
48	-174	.172	.167	.158	·147	·132	.112	.088	-062	.033
50	182	·180	.175	·166	.153	.138	·117	.092	.065	-084
52	189	.187	.181	.171	.159	.143	·122	-095	.068	-035
54	196	194	·188	.178	.165	.148	.126	-099	.070	-03€
56	204	.202	195	185	.171	.154	.181	.108	-078	.038
. 58	211	202	202	192	.177	159	186	.107	-075	-089
î	218	216	202	198	.183	164	140	.111	078	-041
		.223	215	204	189	169	145	.114	·081	-042
2	•225	.223	223	211	196	.175	150	118	-083	.048
4	.233				.202	·180	155	121	·086	-045
6	·240	·238	•230	•217			·155	121	·088	-046
8	.247	•245	•237	224	208	186	.168	·120 ·180	·000 ·091	-048
10	.254	.252	•244	·281	·214	191			-091	-049
12	.262	·260	•252	•237	•220	•196	168	188		-048
14	·269	·267	•258	•244	·226	·202	.178	186	-096	
16	.276	•274	•265	•251	.232	·207	·177	·140	.099	.052
18	.284	•282	.278	257	.238	•218	182	144	101	.058
20	·291	·288	·279	·264	·244	·218	∙187	·148	·104	·056

TABLE OF ORDINATES-CONTINUED.

Ordinates five feet apart .- Chord one hundred feet.

Distances of the Ordinates from the end of the 100 feet Cherd.											
Angle Doff		Middle, 50 feet.	45 feet.	40 feet.	35 feet.	30 feet.	25 feet.	20 feet.	15 foot.	10 feet.	5 feet
•	-										
	2	·298	•295	•285	.270	⋅250	.224	·192	·151	·107	-056
2	4	·306	.303	•298	277	⋅256	.229	·197	·155	·109	·057
	6	·313	·310	⋅300	·284	•263	.235	·201	·159	·112	.059
2	8	·320	·317	∙807	·291	·269	·240	•206	·163	·114	.060
8	0	·327	·324	·814	.297	.275	·246	·210	·167	·117	.062
8	2	·334	·331	·821	⋅804	⋅281	.251	.215	·171	·120	-068
8	4	·341	.338	·828	·810	·287	.257	·219	·174	.122	-068
8	6	.349	·345	⋅885	·817	•293	·262	·224	·178	·125	.066
8	8	.356	.353	.842	·323	·299	.268	.228	·182	-127	.068
4	0	·364	-360	-349	.330	⋅305	.273	.233	·185	·130	-069
4	2	.871	-367	∙356	.837	⋅312	.278	.238	.189	·133	.070
4	4	.378	.374	-868	.343	⋅318	.284	.242	.192	.135	.07:
	6	.385	.382	.370	-850	.324	.289	-247	·196	·138	.078
	8	.393	-389	.377	-356	∙330	.295	.251	.200	·141	.07
	ŏ	·400	-396	-384	-364	-336	-300	.256	·204	·144	-07€
	2	.407	·403	-391	.370	-342	805	.261	.208	·147	.077
	4	.414	·410	-898	.876	-348	·811	.265	.211	·149	.079
	6	.422	·418	.405	-383	.354	.816	.270	.215	.152	.080
5	8	·429	·425	.412	-389	-360	.322	.275	.219	.154	.082
2 "	١	436	·432	·419	-397	-366	827	280	.222	.157	.088
	2	·443	·489	426	402	•373	-832	284	226	.160	·084
	4	.451	•446	·488	.409	-379	-338	289	230	162	·086
	6	458	.454	·440	·416	-385	-348	293	234	.165	.087
	8				425	-391		298	237	·167	.088
		465	·461	•447	·430		·849		241	:	-089
	0	·473	•468	•454	·437	·397	·355	-303		170	
	2	·480	·475	·461		•403	.360	.308	•245	.173	-090
	4	·487	·482	·468	•443	·409	.866	·312	.248	.175	-092
	6	· 4 95	·490	·475	•450	•415	.871	·817	.252	·178	.098
	8	.502	.497	··482	·456	·421	.877	·821	.256	·180	.09
	0	.509	·504	·489	·463	•428	.882	·826	.260	.183	-090
	2	.516	.511	•496	·470	·484	·387	∙830	.264	186	.09
	4	·523	·518	∙508	·476	·440	.893	.334	.267	·188	.099
	6	.531	·526	·510	·483	·446	·898	-888	.271	·191	·100
	8	· 538	·533	·517	· 4 89	· 4 52	·404	·346	.275	·194	·10:
	0	·545	·540	·524	· 49 6	·458	· 4 09	.850	.278	·196	·10
8	2	.552	·547	·531	∙503	·465	·415	·855	.282	·199	·10
3	4	.560	-554	∙538	·509	·471	·420	⋅359	•285	·201	·100
3	6	.567	·562	·5 4 5	·516	·477	· 4 25	⋅364	.289	·204	.10
	8	.574	.569	.552	.522	·488	· 4 31	-368	.293	206	-109
	Ŏ	.582	.576	-559	.529	·489	·436	.373	.297	.209	-110

TABLE OF ORDINATES—CONTINUED.

Ordinates five feet apart .- Chord one hundred feet.

Ė		1	Distances	of the C	rdinates	from the	end of t	he 100 fe	et Chord		
Aug De	le of fi'n.	Middle, 50 feet.	45 feet.	40 feet.	35 feet.	30 feet.	25 feet.	20 feet.	15 feet.	10 feet.	5 foot.
2	, 42	-589	-583	∙566	·536	· 4 95	·441	∙378	·301	•212	·111
4	44	.596	-590	.578	542	.501	.447	-382	-804	214	.113
	46	-603	-598	-580	-549	-507	452	-387	.308	.217	·114
	48	-611	-605	-587	.555	.513	.458	-391	.312	219	.116
	50	·618	-612	-594	.562	.519	.464	-396	.815	.222	·117
	52	-625	-619	-601	-569	.526	.469	·401	.319	.225	·118
l	54	.632	-626	-608	.575	.532	.474	•405	.322	.227	·119
1	56	·640	-634	-615	-582	.538	·480	·410	.326	.230	-121
	58	-647	-641	.622	.588	.544	.485	·414	.330	.232	.128
3	-	.654	·648	.629	-595	.550	.491	·419	.334	.235	·124
ľ	2	·661	-655	.636	-602	.556	·496	.424	.338	.238	.125
	4	-669	-662	.643	-608	.562	.502	.428	·341	.240	.127
	6	-676	.670	.650	-615	.568	·507	·433	.345	.243	.128
	8	-683	-677	-657	.621	.574	.512	·438	.349	.246	·130
	10	-691	⋅684	-664	.629	-581	-518	·443	.353	.249	·131
l	12	-698	-691	-671	-635	-587	.523	·448	.357	.251	.132
	14	.706	· 6 98	-678	.642	-593	.529	·452	.360	.254	·134
	16	.713	.705	-685	.649	-599	.534	·457	.364	.257	·135
1	18	.720	.713	-692	·655	-605	-540	·462	-368	.259	·187
	20	.727	.720	-699	.662	·611	.545	· 4 66	.371	.262	·138
1	22	.734	.727	.706	·668	-617	∙550	·471	.375	.264	139
	24	.742	.734	.713	⋅675	.623	.556	·475	.378	.267	·141
	26	.749	.742	·720	.682	·629	-561	·480	.382	.270	.142
l	28	.756	.749	.727	⋅688	·635	-567	·485	·386	.272	·144
	30	·764	.756	.734	-695	·642	.573	· 48 9	·390	.275	·145
	32	.771	.763	.741	.702	·648	·578	· 4 94	.394	.278	·146
l	34	.779	.770	·748	.708	.654	∙584	·498	⋅897	·280	·148
	86	·786	.777	•755	.715	-660	∙589	·503	•401	.283	·149
	88	·798	·785	.762	.721	·666	∙594	∙508	405	⋅285	·151
1	4 0	-800	.792	•769	·728	·673	-600	·512	•408	.288	·152
	42	⋅807	.799	.776	·734	·679	⋅605	·517	•412	•291	·153
	44	·814	⋅806	·783	.741	·685	·611	· 521	•415	·298	·155
	4 6	·822	⋅814	·790	·748	⋅691	·616	·526	·419	·296	·156
!	4 8	·829	·821	.797	.754	-697	-621	·5 8 1	•423	⋅298	.158
	50	·836	·828	·804	.761	·703	·627	·536	·427	⋅801	159
l	52	·843	·835	•811	·768	·709	.632	·541	·481	·804	·160
	54	850	·842	·818	.774	715	·638	· 54 5	·484	·806	·162
1	56	858	·850	825	·781	.721	·643	·550	· 488	.809	·168
	58	·865	·857	·832	·787	·728	-648	·555	·442	·811	·165
1		⋅873	·864	-839	·794	·734	-6 55	·55 9	·445	·814	·166
		1	<u> </u>	1	<u>.</u>	ļ			l		l

TABLE OF ORDINATES-CONTINUED.

Ordinates five feet apart.—Chord one hundred feet.

		I)istances	of the O	rdinates	from the	end of ti	ne 100 fee	t Chord.		
Ang	ie of L'n.	Middle, 50 feet.	45 feet.	40 feet.	35 feet.	30 feet.	25 feet.	20 feet.	15 feet.	10 foot.	5 feet.
•	•										
4	5	⋅891	·882	·856	⋅810	.749	·668	·571	·454	·820	·169
	10	.909	∙900	·874	·827	·764	-682	∙582	·464	·327	·178
	15	927	∙918	⋅891	⋅844	∙780	⋅695	∙594	·478	·834	·176
	20	·945	·936	.909	∙860	· 7 95	·709	·606	·482	·340	·179
	25	•963	·954	•926	·877	⋅810	·723	·617	· 4 91	⋅847	·183
	30	·981	.972	·944	·893	⋅825	·736	.629	·501	∙354	⋅186
	85	•999	.990	.961	•909	⋅840	·750	·640	∙510	·360	⋅189
	40	1.017	1.008	.979	•926	·855	·764	·652	∙519	·367	∙198
	45	1.036	1.026	-996	.948	·871	.777	·664	.529	.373	·196
	50	1.054	1.044	1.014	.959	⋅886	.791	·676	⋅538	·380	·199
_	55	1.072	1.062	1.031	·976	-901	·804	-687	.547	⋅386	.203
3		1.091	1.080	1.048	.993	·917	⋅818	·699	·557	.393	.207
	5	1.109	1.098	1.065	1.009	.932	·831	.711	·566	·400	·210
	10	1.127	1.116	1.083	1.026	∙947	·845	·722	∙576	·406	·214
	15	1.146	1.134	1.100	1.042	•968	-859	·734	∙585	·413	.217
	20	1.164	1.152	1.118	1.058	∙978	-872	.746	.594	· 4 19	.220
	25	1.182	1.170	1.135	1.075	.993	·886	.757	·603	·426	.224
	30	1.200	1.188	1.153	1.092	1.009	.900	.769	613	.432	.228
	85	1.218	1.206	1.170	1.108	1.024	.918	·781	.622	·438	·281
		1.236	1.224	1.188	1.124	1.039	.927	·792	· 6 31	·445	.235
	45	1.255	1.242	1.205	1.141	1.055	.941	·804	.640	·452	.238
	50	1.278	1.260	1.223	1.157	1.070	.954	·816	.649	.458	·241
		1.291	1.278	1.240	1.174	1.085	.967	·827	-658	·465	•245
ŝ	-	1.809	1.296	1.258	1.191	1.100	.982	-839	-668	.472	·248
٠	5	1.327	1.814	1.275	1.207	1.115	.995	·851	.677	.478	.251
		1.345	1.332	1.298	1.224	1.130	1.009	·862	686	485	255
	15	1.364	1.850	1.810	1.240	1.146	1.023	·874	.696	·492	.259
		1.382	1.368	1.328	1.256	1.161	1.036	·886	.705	·498	.262
	25	1.400	1.386	1.845	1.273	1.176	1.050	897	.714	505	.266
		1.419	1.404	1.362	1.290	1.192	1.064	.909	.724	.511	.269
		1.437	1.422	1.379	1.306	1.207	1.077	.921	.733	.517	272
		1.455	1.440	1.897	1.323	1.222	1.091	•932	.742	.524	276
		1.473	1.458		1.339	1.238	1.105	944	.752	•531	280
	50	1.491	1.476	1.432	1.855	1.253	1.118	956	.761	.537	283
		1.509	1.494	1.450	1.372	1.268	1.132	967	.770	.544	287
?	90	1.528	1.512	1.467	1.389	1.284	1.146	.979	.779	-551	290
•	5	1.546	1.530	1.484	1.405	1.299	1.159	.991	.788	-557	·293
			1.548	1.502	1.422	1.314	1.178	1.002	.798	·564	297
		1.582	1.566	1.502 1.520	1.422	1.330	1.187	1.014	-807	.570	·801
		1.600	1.584	1.520	1.454	1.345	1.200	1.026	·816		·804
	20	7.000	1.004	1.001	1.404	1.049	1.200	1.020	.010	.576	.004

TABLE OF ORDINATES-Continued.

Ordinates five feet apart.—Chord one hundred feet.

		. 1	Distances	of the O	rdinates	from the	end of t	he 100 fee	t Chord		
Ang	le of l'n.	Middle, 50 feet.	45 feet.	40 feet.	35 feet.	30 feet.	25 feet.	20 feet.	15 feet.	10 feet.	5 feet.
0	<u>'</u>	1 010	1.602	1.555	1 471	1.360	1.214	1.037	·825	F00	-308
7	25	1.618			1.471	1.875			835	·583	
	30	1.687	$1.620 \\ 1.638$	1·572 1·589	1·488 1·504	1.390	1·228 1·241	1.048 1.060	·844	·590 ·596	·311 ·314
	85 40	1·655 1·673	1.656	1.607	1.521	1.405	1.255	1.000	854	-603	·318
	45	1.692	1.674	1.624	1.537	1.421	1.269	1.088	863	·610	-321
	50	1.710	1.692	1.641	1.558	1.436	1.282	1.095	-872	·616	-324
	55	1.728	1.710	1.659	1.570	1.451	1.296	1.106	-881	623	-328
8	ยย	1.746	1.728	1.677	1.587	1.467	1.310	1.118	-891	629	-332
0	15	1.801	1.782	1.729	1.637	1.518	1.351	1.153	.918	649	.342
	80	1.855	1.836	1.782	1.687	1.559	1.392	1.188	.946	-669	.353
	45	1.910	1.890	1.834	1.737	1.605	1.433	1.223	.974	-689	-363
ŝ	40	1.965	1.944	1.886	1.787	1.651	1.474	1.258	1.002	.708	.373
9	15	2.019	1.998	1.989	1.837	1.696	1.515	1.293	1.030	.728	.384
	30	2.074	2.052	1.991	1.887	1.742	1.556	1.328	1.057	.748	-394
	45	2.128	2.106	2.044	1.937	1.788	1.597	1.363	1.085	.767	.405
10	10	2.183	2.161	2.096	1.987	1.834	1.637	1.398	1.114	.787	.415
10	15	2.238	2.215	2.148	2.037	1.880	1.678	1.433	1.142	-807	.425
	80	2.292	2.269	2.201	2.087	1.926	1.719	1.468	1.170	-827	·436
	45	2.847	2.323	2.254	2.136	1.972	1.761	1.503	1.198	-846	.446
ııı		2.401	2.377	2.306	2.186	2.018	1.802	1.538	1.226	-866	-457
	15	2.456	2.432	2.359	2.236	2.064	1.843	1.574	1.254	-886	.467
	80	2.511	2.486	2.411	2.286	2.110	1.884	1.609	1.282	-906	.478
	45	2.566	2.540	2.464	2.336	2.156	1.926	1.644	1.310	.926	·488
12		2.620	2.594	2.516	2.386	2.203	1.967	1.680	1.339	.946	.499
	15	2.675	2.649	2.569	2.436	2.249	2.008	1.715	1.367	.966	.509
ŀ	80	2.730	2.703	2.621	2.485	2.295	2.049	1.750	1.395	.985	.520
	45	2.785	2.757	2.674	2.535	2.341	2.091	1.785	1.423	1.005	.530
13		2.839	2.811	2.726	2.585	2.387	2.132	1.820	1.451	1.025	.541
	15	2.894	2.865	2.779	2.635	2.483	2.173	1.855	1.479	1.045	-551
	30	2.949	2.920	2.832	2.685	2.479	2.214	1.891	1.507	1.065	.562
	45	8.000	2.974	2.884	2.735	2.525	2.256	1.926	1.535	1.085	.572
14		3.058	3.028	2.937	2.785	2.571	2.297	1.961	1.564	1.105	.583
	15	3.113	3.082	2.989	2.834	2.618	2.338	1.996	1.592	1.124	.598
	30	3.168	3.136	8.042	2.884	2.664	2.379	2.031	1.620	1.144	·604
٦	45	3.222	3.191	3.094	2.934	2.710	2.421	2.067	1.648	1.164	·614
15		8.277	3.245	3.147	2.984	2.756	2.462	2.102	1.676	1.184	-625
	15	8.332	3.299	3.200	3.034	2.802	2.508	2.137	1.704	1.204	-685
1	80	3.387	3.354	8.252	3.084	2.848	2.544	2.172	1.732	1.224	-646
	45	3.442	3.408	3.305	3.134	2.895	2.586	2.208	1.760	1.244	⋅656
16		3.496	3.462	3.858	8.184	2.941	2.627	2.243	1.789	1.264	-667

TABLE OF ORDINATES—CONTINUED.

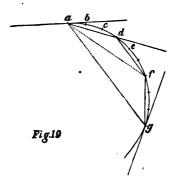
Ordinates five feet apart.—Chord one hundred feet.

		I	Distances	of the O	rdinates :	from the	end of th	a 100 fee	t Chord.		
Angl Def		Middle, 50 feet.	45 feet.	40 feet.	35 feet.	30 feet.	25 feet.	20 feet.	15 feet.	10 feet.	5 feet.
16	, 30	3-606	8.571	8.463	3.284	3.033	2.710	2.314	1.845	1.804	-688
17	90		3.680	8.569	3.384	8.125	2.792	2.384	1.902		.709
1,	80	3.826	3.788	8.674	3.484	3.218	2.875				.730
18	00	3.935	3.897	3.779	3.584	3.310	2.958	2.525	2.014	1.424	.751
10	80	4.045		3.885	3.684	3.403	3.040		2.071	1.464	.772
19	90	4.155		3.990	3.784		8.123	2.666	2.127	1.504	.793
10	80		4.223	4.096	3.884	3.588	3.205	2.787	2.184	1.544	⋅814
20	υυ	4.375	4.832	4.201	3.984	3.680	3.288	2.808		1.588	-886
21		4.595	4.549	4.412	4.184	3.864	8.454	2.950	2.353	1.668	-879
22			4.768	4.624	4.886	4.050	3.620	3.093	2.467	1.744	.922
23			4.986	4.836	4.587	4.237	3.786	3.236		1.824	965
24			5.204	5.048	4.789	4.423	3.952	8.379		1.905	1.008
$\overline{25}$		5.476	5.422	5.260	4.989	4.609	4.119	3.522	2.809	1.986	1.051
26			5.642	5.473	5.192	4.798	4.286	3.665	2.924	2.068	1.094
27			5.860	5.685	5.393	4.984	4.454	3.808			1.137
28		6.139		5.898	5.595	5.171	4.622	3.952			1.181
29		6.361	6.298	6.110	5.796	5.357	4.790	4.095	8.269	2.814	1.224
30		6.582	6.517	6.823	5.999	5.544	4.958	4.239	3.385	2.396	1.268
81		6.804		6.537	6.202	5.733	5.127	4.384		2.481	1.312
32		7.027	6.957	6.751		5.922	5.297	4.530		2.565	1.356
33		7.249	7.178	6.965	6.609	6.111	5.467	4.676	3.737	2.649	1.401
34		7.472	7.398	7.179	6.813	6.300	5.637	4.822		2.733	1.445
85		7.694	7.619	7.393	7.017	6.489	5.807	4.968		2.817	1.490
36		7.918	7.841	7.609	7.222	6.679	5.978	5.115	4.090	2.901	1.535
37		8.143	8.063	7.825	7.427	6.870	6.149	5.262		2.985	1.581
38		8.367	8.286	8.041	7.633	7.060	6.320	5.410	4.327	3.069	1.626
39		8.592	8.508	8.257	7.838	7.251	6.491	5.557		8.158	1.672
40		8.816	8.781	8.474	8-044	7.442		5.705		3.238	

ARTICLE XXI.

ON LONG CHORDS.

It is sometimes convenient, in preliminary locations, to lay off curves by chords longer than 100 feet. For instance, in fig. 19, instead of running from a by chords a b, b c, c d, &c. of but 100 feet, points d, f, g, &c. may be obtained with less trouble by using three times the tangential or deflection angles of the table, (as the case may be,) and employing chords a d, d f, f g, &c. nearly three times as



long as the chords ab, bc, &c.; or if ad, df, fg be either 2 or 4 stations apart, then 2 or 4 times the tangential and deflection angles would be used; and chords nearly 2 or 4 times 100 feet in length.

The following table contains the precise length of chord required to subtend respectively 1, 2, 3, or 4 stations. It is seldom desirable to exceed the latter limit.

TABLE OF LONG CHORDS.

Radius in feet.	Angle of Deflection.	Leng	gth of Chord in 1	feet required to	subtend
Kadius in 18ec.	Deflection.	1 Station.	2 Stations.	3 Stations.	4 Stations.
5780-0	10	100	200-0	300.0	400 0
4584.0	1 1	100	200.0	800.0	399.9
3820.0	1 1	100	200.0	300∙0	399.9
3274.0		100	200.0	800.0	899.8
2865.0	20 *	100	200.0	299.9	399.7
2547.0	1	100	200.0	299.9	399∙6
2292.0	100 mg/4	100	200.0	299.8	399∙5
2084.0	- 4	100	200.0	299.8	399.4
1910-0	go ⁴	100	200.0	299.7	399.3
1763.0		100	200.0	299.7	399.2
1637.0	1	100	200.0	299.6	399-1
1528.0	3	100	200.0	299.6	899.0
1488.0	40 1	100	199.9	299.6	398.9
1848.0	1 1	100	199.9	299.5	398.7
1274.0	į	100	199.9	299.4	398∙5
1207.0	141 15100 M	100	199.9	299.3	398.3
1146.0	50 -	100	199.9	299.2	398.0
1092.0	1	100	199.8	299.1	897.8
1042.0	1	100	199.8	299.0	397.6
996.8	9	100	199.7	298.9	897.5
955.4	6° -	100	199.7	298.8	897.8
917.0	1	100	199.7	298.7	397.0
882.0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100	199.7	298.6	396.7
849.3	3	100	199.6	298.5	396.5
819.0	70 -	100	199.6	298.4	396.2
790.8	1 1	100	199-6	298.3	396∙0
764.5	🛔	100	199.6	298.2	395.7
789.9	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100	199.6	298.1	395·4
716.8	80 3	100	. 199.6	298.0	395-1
695.1	1	100	199.5	297.9	394.8
674.6	1000	100	199∙5	297.8	394.5
655.5	3	100	199-4	297.7	894.8
687.8	90 -	100	199-4	297.5	394·1
620.2	1	100	199-4	297.4	393· 7
603.8		100	199-3	297.3	393.2
588.4	100	100	199-2	297.2	392.8
578.7	10° °	100	199.2	297.0	392.4

For radii less than 573.7 feet, it is never required to use longer chords than 100 feet.

When this method of laying out curves by long chords is used, the instrument should be moved to each successive point after it is determined, in order to fix the next one, instead of attempting to obtain more than one point from one position of the instrument; because when the chords are longer than one chain, they cannot be measured in the right direction by eye, but must be guided by the instrument.

It must be especially borne in mind that, in any given curve, only the tangential and deflection angles increase in the same proportion as the number of 100 feet stations subtended by the long chord. Therefore, these long chords cannot be used for laying out curves by eye, as their tan-

gential and deflection distances are not known.

When it is required to use long chords for turning a curve by eye, they must be composed of a number of whole chains, being made say 200, 300, or 400, &c. feet in length. The tangential and deflection distances of curves of more than 500 feet radius may then be assumed, in practice, to increase as the squares of the number of chains in the length of the long chord. For instance, to lay off a 5° curve by chords of 200, 300, or 400 feet in length, the tangential and deflection distances of the table must be multiplied by 4, 9, or 16, as the case may be. In this case the tangential and deflection angles are unknown.

This is not mathematically correct, but will answer in practice for the curves on a canal or common road, where

great nicety is not needed.

The only proper instrument for running lines of survey is the transit, furnished with a compass and with a revolving telescope. The deflections being measured in angles, serve as a check to the numerous sources of error to which the compass is liable, arising from local attraction, electrical action in the glass cover, diurnal variation, &c. &c. Besides, when the compass alone is used, it is necessary to test every course or bearing from each end of each station; and this involves loss of time.

The following is a good form of field-book for the transit and compass combined.

Station.	Distance.	Total Distance.	l .	in Degrees.	The right hand page is left blank for Remarks, and Sketches of Topogra- phy.
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In every locating party there should be one person whose duty is to obtain, and record the transverse slopes of the ground at each station. His observations will usually extend to from fifty feet, to one hundred yards on each side of the centre stakes, depending on a variety of circumstances of locality which cannot be alluded to here. In preliminary locations these slopes need not be taken with very great nicety, as they will be used chiefly for ascertaining, approximately, the amount of excavation and embankment, by the rapid process described in my little volume on that subject, and which dispenses with nearly all the labor of the usual calculations.

After the final location is made, the slopes should be taken again, with great care, to the nearest quarter of a degree; but need not extend beyond the width actually occupied by the road. Their use in this second operation will be for determining the cubic contents with more precision than before, for final estimates; and also for obtain-

ing the positions of the side-stakes.

Should the duty of recording these slopes devolve upon the compassman, (which it should not,) it will be necessary to add another column to his field-book, after that containing the deflections. In this column he will insert the slopes, thus, (Fig. 20.) the dot representing the center stake. The degrees of slope are written above the lines, and the distance in feet to which they extend, below.

The slopes are taken by laying a long rod on the ground, at right angles to the line of survey, as nearly as may be judged by eye, and measuring the angles by means of a small slope instrument placed upon the rod. These are

made by most of our instrument-makers.

ARTICLE XXII.

TO ADJUST A TRANSIT INSTRUMENT.

Having placed the transit firmly at a, fig. 21, and levelled it, clamp all fast, and direct the cross-hairs, by means of the tangent screw, to some convenient object, b. Then, revolving the telescope vertically, but without moving it in the least horizontally, let the cross-hairs fix upon a second

2

object in the opposite direction, as c; or, if there be no such object, place one, as for instance a chain-pin, at any convenient distance.



Then unclamp the lower clamp, and revolve horizontally the entire upper part of the instrument above the parallel plates. Clamp it again, and fix the cross-hairs upon b; then again revolve the telescope vertically. If the sight now strikes c, as before, it is in adjustment; but if not, place another object, d, where it does strike; and with the adjusting pin alter the vertical cross-hair so as to strike halfway between d and c. The instrument will then be in adjustment.

Two or more trials will generally be needed before the

adjustment is perfect.

With care, and on a firm floor, the operation may be performed in a long room, or by placing the instrument in a doorway communicating with two rooms of moderate size. Fine pins, or needles should then be used as the objects to be sighted at. It is better, however, to adjust out of doors, with more distant objects. It is also a good precaution to hang up a long plumb-line, or select some vertical object, and see whether the vertical hair coincides with it, as the telescope is raised or lowered. If from any accident, or carelessness in its construction, it does not, the defect must be remedied by an instrument-maker.

0 Deg. 0 Deg.

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Cosine.	9999289 9999289 9999143 9999105 99999025 9999894 9999896 99988726 99998677 99998677 99998677 99998677 99998677 99998677	Sine.
Cotang.	83-84350 81-84704 78-12634 76-39000 74-73910 71-61507 71-61507 71-61507 71-61507 68-7608 66-10547 68-85800 66-10547 68-85800 61-38290 60-30582 61-38290 60-30582 61-38290 60-30582 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38290 61-38280	Tang.
Tang.	011927 012217 012217 012799 013381 014254 014254 014256 015127 015127 015009 015009 015009 015009 015755	Cotan.
Sine.	0119261 0122170 0122079 0120896 0138805 013862 013862 0142530 0142530 0148348 015165 0167165 0167199 0167199 0167199 0167199	' Cosine. Cotan.
_	44443 44443 44444 4444 4444 4444 4444	-
-	00000000000000000000000000000000000000	1
Cosine.	9999811 999977 999977 999977 999966 999966 999966 999968 999968 999942 999942 999942 999933	Sine.
Cotang.	63-7001 156-2590 443-2371 157-5075 132-3739 114-540 1114-540 1114-540 110-8920 007-4264 104-1709 104-1	Tang.
Tang.	006108 -006399 -007272 -007272 -007854 -008145 -008145 -008145 -009175 -009017 -009017 -009017 -009017 -009017 -009017 -009017 -009017 -009017 -009017 -009017 -009017 -009017 -009017 -009017	Cotsu.
Sine.	0061086 0063995 00063995 00073630 00073630 00078539 00081448 00081448 00081744 00081746 0009174 0009174 0009174 0009174 0009174 0009174 0009174 0009174 0009174 0009174 0009174 0009174 000910180 01007627 01107627 01107627	/ Cosine. Cotan. Tang.
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Cosine.	0.0000000 000000 Infinite. 1000000 5922 0065995 006599 156-2590 99999813 3941 011926f '011927 83-84350 9999254 18 2 0.0005818 0.000582 1718-873 9999998 5622 0065995 006599 165-2590 99999813 3842 0122170 012217 81-84704 9999254 18 3 0.0005818 0.000582 1718-873 9999998 5622 0065991 006590 149-4650 9999765 3842 0122170 012217 81-84704 9999254 18 3 0.000582 1718-873 9999998 5625 0072721 0072721 9999976 3644 0127987 907-85300 9999148 16 4 0.001163 885-94363 9999998 5625 0072721 0072721 9999976 3644 0127987 907-85300 9999148 16 5 0.001454 001454 685-9488 9999998 5625 0072721 0072721 37-5075 9999976 3644 0127987 97-82390 9999065 12 7 0.002035 002036 491.066 9999999 5625 0072721 0072721 137-5075 9999968 2344 0132899 999926 12 8 0.002217 0022327 129-7775 99999979 5328 0081448 008425 114-5846 1999968 3244 01454 687-701534 9999966 12 8 0.002217 0022327 129-7775 99999979 5328 0081448 008425 114-5896 999968 3246 014543 014545 687-5008 9999924 1 9 0.002618 0002618 381-9709 9999996 5020 008425 008425 114-5896 999965 3246 014543 014545 687-5008 9999924 1 1 0.002968 0002618 381-9709 9999996 5020 008425 009407 110-892 999955 2951 0148348 014826 67-10185 999896 1 1 0.002968 0002908 343-7737 9999996 5020 009999 101-109 9999957 2852 015126 015418 697500 999991 1 1 0.002968 0002908 343-7737 9999998 4833 0099998 101-108 999955 2951 0148348 014826 67-10185 999891 1 1 0.002968 0002908 0002908 443-000890 0101-109 999955 2852 015126 015418 999998 1 2 0.002618 0002508 124-5777 9999998 4473 009890 000890 101-109 9999957 2852 015126 015418 6999998 1 2 0.002618 0002508 124-8576 9999998 4473 0008990 0101-109 9999958 2555 015289 016291 61-38290 999986 1 2 0.0046724 0046072 245.5519 999997 443-010859 010819 98-2794 9999958 2555 015289 016291 999997 1 2 0.004654 000000000000000000000000000000000	Sine.
Cotang.	Infinite. 3437-746 11145-915 859-4363 889-4363 687-5488 572-9572 491-1060 129-7175 381-9709 343-7737 312-5213 226-477 226-278	Tang.
Tar.g.	000000 0000291 000163 0001163 0001745 0002327 002327 002327 002327 004363 004072 004065 004065 006526 006526	Cot n.
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-	0-8846668655666666666	1.

Deg. 89

Deg. 89.

NATURAL SINES AND TANGENTS TO A RADIUS 1 1 Deg. 1 Deg.

1		4 19	816	2 17	4 16	9 15	7 14	7 13	6.12	4 11	1 10	8	00	7 18	2 6	5	8 4	9 3	0 2	9 1	0 8	-
	Cosme.	899666	999559	-999551	-999542	-999533	-999524	999515	9999506	-999497	999488	-999478	-999469	999459	-999450	-999440	.999430	-999420	-999411	999400	068666-	0
	Cotang.	34.02730	33-69350	33-36619	33-04517	32-73026	32-42129	32-11809	31-82051	31.52839	31-24157	30-95992	30-68330	30-41158	30-14461	29-88229	29-62449	29-37110	29-12200	28.87708	28-63625	Thomas
	Tang.	-029388	629620	029970	030261	030552	030843	-031135	-031426	-031717	.032008	.032299	.032591	032882	-033173	-033464	-033755	034047	034338	034629	-034920	Coming Coton
	Sine.	-0293755	.0296662	0299570	0302478	-0305385	0308293	0311200	0314108	-0317015	0319922	0322830	-0325737	0328644	-0331552	0334459	-0337366	-0340274	0343181	-0346088	-0348995	Carino
		41	42	43	44	45	46	47	48	49	50	51	55	53	54	25	99	57	58	69	09	1-
-		39	38	37	36	35	34	33	35	31	30	29	28	27	26	25	24	23	22	21	30	1
	Cosme.	9997224	9997156	9802666	-9997015	-9996943	17899999	8629666	·9996724	-9996649	-99966573	-9996497	9996419	-9996341	-9996262	9996182	1019666	0209666	9995937	9995854	9995770	O.i.o
	Cotang.	0-0174524 -017455 57-28996 -9998477 60 21 -0235598 -023566 42-43346 -9997224 3941 -0293755 -029388 34-02730 -9995684	$ \cdot 0177432 \cdot 017746 \cdot 56 \cdot 35059 \cdot 9998426 \cdot 5998426 \cdot 59282 \cdot 0238506 \cdot 023857 \cdot 41 \cdot 91579 \cdot 9997156 \cdot 3842 \cdot 0296662 \cdot 029679 \cdot 33 \cdot 69350 \cdot 9995599 $	$-0180341 \cdot 018037 55 \cdot 44151 \cdot 9998374 \cdot 58 \cdot 23 \cdot 0241414 \cdot 024148 \cdot 41 \cdot 41058 \cdot 9997086 \cdot 3743 \cdot 0299570 \cdot 029970 \cdot 33 \cdot 36619 \cdot 9995512 \cdot 23 \cdot 33 \cdot 33 \cdot 33 \cdot 33 \cdot 33 \cdot 33 \cdot $	$ \cdot 0183249 \cdot 018328 \cdot 54 \cdot 56130 \cdot 9999321 \cdot 57 \cdot 24 \cdot 0244322 \cdot 024439 \cdot 40 \cdot 91741 \cdot 9997015 \cdot 36141 \cdot 0302478 \cdot 030261 \cdot 33 \cdot 04517 \cdot 9995424 \cdot 32 \cdot 32 \cdot 32 \cdot 33 \cdot 33 \cdot 33 \cdot 33 \cdot$	$-0.186158 \cdot 0.18619 \cdot 53 \cdot 70858 \cdot 9998267 \cdot 56 \cdot 25 \cdot 0.24733 \cdot 0.24730 \cdot 40.43583 \cdot 9996943 \cdot 35 \cdot 45 \cdot 0.305385 \cdot 0.30552 \cdot 32.73026 \cdot 9995336 \cdot 1.5 \cdot 0.20558 \cdot 0.2058 \cdot 0.$	$ \bullet 0189066 \cdot 018910 \cdot 52 \cdot 88211 \cdot 99998213 \cdot 55 \cdot 26 \cdot 0250138 \cdot 025021 \cdot 39 \cdot 96546 \cdot 9996871 \cdot 3446 \cdot 0308293 \cdot 030843 \cdot 32 \cdot 42129 \cdot 9995247 \cdot 123 \cdot 1$	$ \bullet 0191974 \cdot 019201 \cdot 52 \cdot 08067 \cdot 9998157 \cdot 5487 \cdot 0253046 \cdot 025312 \cdot 39 \cdot 50589 \cdot 9996798 \cdot 3347 \cdot 0311200 \cdot 031135 \cdot 32 \cdot 11809 \cdot 9995157 \cdot 32 \cdot 11809 \cdot 9995167 \cdot 32 \cdot 11809 $	$ \bullet 194883, \circ 19492, \circ 13130315, \circ 9998101, \circ 5328, \circ 255954, \circ 255603, \circ 39.05677, \circ 9996724, \circ 314108, \circ 314108, \circ 31426, \circ 31.82051, \circ 9995066, \circ 122051, \circ 314108, \circ 314108$	$ \cdot 0197791 \cdot 019783 \cdot 50 \cdot 54850 \cdot 9998044 \cdot 5229 \cdot 0258862 \cdot 0258862 \cdot 026894 \cdot 38 \cdot 61773 \cdot 9996649 \cdot 3149 \cdot 0317015 \cdot 031717 \cdot 31 \cdot 52839 \cdot 9994974 \cdot 031779 \cdot 031717 \cdot 0$	$9 \cdot 0200699 \cdot 020074 \cdot 49 \cdot 81572 \cdot 9997986 \cdot 51 \cdot 30 \cdot 0261769 \cdot 026185 \cdot 38 \cdot 18845 \cdot 9996573 \cdot 30 \cdot 50 \cdot 0319922 \cdot 032008 \cdot 31 \cdot 24157 \cdot 9994881 \cdot 31 \cdot$	$0.0203608 \cdot 020366 \ 49 \cdot 10388 \cdot 9997927 \ 50 \ 31 \cdot 0264677 \ 1026477 \ 137 \cdot 76861 \cdot 9996497 \ 29 \ 51 \cdot 0322830 \ \cdot 032299 \ 30 \cdot 95992 \ \cdot 9994788 \ \cdot 0322830 \ \cdot 032299 \ \cdot 032299$	1.0206516.0206564841208.99978674932.02676859.02676837.35789.99964192852.03257.032577.03259130.68330.9994693811.020656666666666666666666666666666666666	$2 \cdot 0209424 \cdot 020947 \cdot 47 \cdot 73950 \cdot 9997807 \cdot 48 \cdot 33 \cdot 0270493 \cdot 027059 \cdot 36 \cdot 95600 \cdot 9996341 \cdot 27 \cdot 53 \cdot 0328644 \cdot 032882 \cdot 30 \cdot 41158 \cdot 9994598 \cdot 30 \cdot 41168 \cdot 30 \cdot 4168 \cdot 30 \cdot 41168 \cdot 30 \cdot 41168 \cdot 30 \cdot 41168 \cdot 30 \cdot 41168 \cdot 30 \cdot 4168 \cdot 30 \cdot 41168 \cdot 30 \cdot 41168 \cdot 30 \cdot 41168 \cdot 30 \cdot 41168 \cdot 30 \cdot 4168 \cdot 30 \cdot 41168 \cdot 30 \cdot 41168 \cdot 30 \cdot 41168 \cdot 30 \cdot 41168 \cdot 30 \cdot 4168 \cdot 4168 \cdot 30 \cdot 4168 \cdot 30 \cdot 4168 \cdot 30 \cdot 4168 \cdot 30 \cdot 4168 \cdot 416$	$ \begin{array}{c} 3 \cdot 0212332 \cdot 02123347 \cdot 08534 \cdot 9997745 \cdot 47 \cdot 34 \cdot 0273401 \cdot 027350 \cdot 36 \cdot 56265 \cdot 9996262 \cdot 265 \cdot 40331552 \cdot 033155 \cdot 033173 \cdot 30 \cdot 14461 \cdot 9994502 \cdot 203123 \cdot 203155 \cdot 203173 \cdot 2031$	$14.0215241.021529\\ 146.44886.9997683\\ 14635.0276309.027641\\ 36.17759.9996182\\ 2555.0334459\\ 0334459\\ 033464\\ 29.88229.9994405$	$15.0218149 \cdot 021820 \cdot 45.82935 \cdot 9997620 \cdot 45 \cdot 36 \cdot 0279216 \cdot 027932 \cdot 35.80055 \cdot 9996101 \cdot 24 \cdot 56 \cdot 0337366 \cdot 033755 \cdot 29.62449 \cdot 9994308 \cdot 39.62449 \cdot 3994308 \cdot 39.62449 \cdot 3994308 \cdot 39.62449 \cdot 3994308 \cdot 39.62449 \cdot 39.62499 \cdot 39.62449 \cdot 3$	$6.0221057.022111\ 45.22614\ 49997556\ 44\ 37\ 0282124\ 028223\ 35.43128\ 9996020\ 2357.0340274\ 034047\ 29.37110\ 9994209$	$7 \cdot 0223965 \cdot 022402 \cdot 44 \cdot 63859 \cdot 9997492 \cdot 4338 \cdot 0285032 \cdot 028514 \cdot 35 \cdot 06954 \cdot 9995937 \cdot 2258 \cdot 0343181 \cdot 034338 \cdot 29 \cdot 12200 \cdot 9994110$	$ 8 \cdot 0226873 \cdot 02269344 \cdot 06611 \cdot 999742614239 \cdot 0287940 \cdot 028896534 \cdot 71511 \cdot 9995854 \cdot 2159 \cdot 034608 \cdot 034629 \cdot 2887708 \cdot 9994009 \cdot 2887708 \cdot $	$\begin{array}{c} 9.0229781\ 0.022944\ 43.50812\ .9997360\ 41\ 40\ .0290847\ .029097\ 34.36777\ .9995770\ 20\ 60\ .0348995\ .034920\ 28.63625\ .9993908 \\ \hline 0.0232690\ .023275\ 42.96407\ .9997292\ 40 \\ \end{array}$	Thomas
	Tang.	-023566	023857	-024148	-024439	024730	025021	-025312	-025603	025894	026185	-026477	926768	-027059	027350	-027641	-027932	.028223	028514	028805	-029097	Caton
6	Sine,	0235598	-0238506	-0241414	0244322	0247230	-0250138	0253046	0255954	0258862	0261769	0264677	0267585	0270493	0273401	0276309	0279216	0282124	0285032	0287940	0290847	Coming
ŀ		21	22	23	24	25	36	22	80	53	30	31	35	33	34	35	36	37	38	39	40	1.
1		60	59	58	57	99	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	1
	Cosine.	9998477	9898456	-9998374	-9998321	-9998267	.9998213	·9998157	1018666	-9998044	9864666	-9997927	7987867	49997807	-9997745	-9997683	9997620	9997556	-9997492	-9997426	19 0229781 022984 43.50812 9997360 41 20 0232690 023275 42.96407 9997292 40	0
	Tang. Cotang. Cosine.	57-28996	56-35059	55-44151	54-56130	53-70858	52-88211	52-08067	51-30315	50-54850	49-81572	49-10388	48-41208	47-73950	47.08534	46-44886	45-82935	45-22614	44.63859	44.06611	43-50812 42-96407	Thomas
	Tang.	-017455	-017746	018037	-018328	018619	018810	.019201	-019492	019783	-020074	.020365	-020656	020947	-021238	-021529	-021820	.022111	.022402	-022693	-022984 -023275	1
	Sine.	-0174524	-0177432	-0180341					-0194883	-0197791	6690020-	.0203608	-0206516	-0209424	-0212332	-0215241	0218149	-0221057	-0223965	-0226873	-0229781 -0232690	
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	Cosine.	-9989035	9988899	1928866	-9988623	-9988484	9988344	9988203	1908866	9987919	9987775	1892866-	9987486	9987340	9987194	9987046	8689866	9986748	9986598	9986447	9986299	Sine.
- 1	Cotang.	-0348995 -034920 28-63625 -9993908 60 21 -0410037 -041038 24-36750 -9991590 3941 -0468159 -046867 21.33685 -9989035 19	$0.351902 \cdot 0.35212 \cdot 28 \cdot 39939 \cdot 9993806 \cdot 59 \cdot 22 \cdot 0412944 \cdot 041329 \cdot 24 \cdot 19571 \cdot 9991470 \cdot 38 \cdot 42 \cdot 0471065 \cdot 047158 \cdot 21 \cdot 20494 \cdot 9988899 \cdot 24 \cdot 10571 \cdot 24 \cdot 2$	$-0.354809 \\ \cdot 0.355603 \\ \cdot 28.16642 \\ \cdot 9993704 \\ \cdot 0845850 \\ \cdot 04165850 \\ \cdot 041621 \\ \cdot 24.02632 \\ \cdot 9991350 \\ \cdot 9991350 \\ \cdot 0473970 \\ \cdot 047350 \\ \cdot 047450 \\ \cdot 21.07466 \\ \cdot 9988761 \\ \cdot 04760 \\ \cdot 04766 \\ \cdot 9988761 \\ \cdot 04760 \\ $	$0.357716 \cdot 0.35794 \cdot 27 \cdot 93723 \cdot 9993600 \cdot 5724 \cdot 0418757 \cdot 041912 \cdot 23 \cdot 85927 \cdot 9991228 \cdot 3644 \cdot 0476876 \cdot 047741 \cdot 20 \cdot 94596 \cdot 9988623 \cdot 0357716 \cdot 0476876 \cdot 0476876 \cdot 047741 \cdot 20 \cdot 94596 \cdot 0476876 \cdot $	$0.360623 \cdot 0.36085 \cdot 27 \cdot 71174 \cdot 9993495 \cdot 5626 \cdot 0.421663 \cdot 0.42203 \cdot 23 \cdot 69453 \cdot 9991106 \cdot 3545 \cdot 0.479781 \cdot 0.48033 \cdot 20 \cdot 81882 \cdot 9988484 \cdot 20 \cdot 81882 \cdot 20 \cdot$	$-0.363530 \\ -0.36377 \\ 27 \\ 48985 \\ -0.48265 \\ -0.424569 \\ -0.424265 \\ -0.36328 \\ -0.9990983 \\ -0.9990983 \\ -0.9482687 \\ -0.$	$\cdot 0366437 \cdot 036668 \cdot 27 \cdot 27148 \cdot 9993284 \cdot 5487 \cdot 0427476 \cdot 042786 \cdot 23 \cdot 37177 \cdot 9990859 \cdot 3347 \cdot 0485592 \cdot 048616 \cdot 20 \cdot 56911 \cdot 9988203 \cdot 0366437 \cdot 048568 \cdot 27 \cdot 27148 \cdot 2993284 \cdot 248616 \cdot 20 \cdot 248616 \cdot$	$-0369344 \\ -036959 \\ 27 \\ -05655 \\ -9993177 \\ \\ -5328 \\ -043078 \\ \\ -043078 \\ \\ \\ 23 \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $	$\cdot 0372251 \cdot 037250 \cdot 26.84498 \cdot 9993069 \cdot 5289 \cdot 0433288 \cdot 043369 \cdot 23 \cdot 05767 \cdot 9990609 \cdot 3149 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10 \cdot $	$13.0386785 \cdot 038707 / 25.83482 \cdot 9992517 / 47 / 34 \cdot 0447818 \cdot 044826 / 22.30809 \cdot 998966 / 26 / 64 \cdot 0505929 \cdot 050657 / 19.74029 \cdot 9987194 / 19.74029 \cdot 9$	$14.0389692 \cdot 0389692 \cdot 25.64183 \cdot 9992404 \cdot 4635 \cdot 0450724 \cdot 045118 \cdot 22.16398 \cdot 9989837 \cdot 2565 \cdot 0508835 \cdot 050949 \cdot 19.62729 \cdot 9987046 \cdot 046718 $	15 + 0392598 + 039290 + 25 + 45170 + 9992290 + 45 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 1	$16 \cdot 0395505 \cdot 039581 \cdot 25 \cdot 26436 \cdot 9992176 \cdot 44 \cdot 37 \cdot 0456536 \cdot 045701 \cdot 21 \cdot 88125 \cdot 9989573 \cdot 2357 \cdot 0514645 \cdot 051532 \cdot 1940513 \cdot 9986748 \cdot 2010000000000000000000000000000000000$	$47.0398411 \cdot 039872 \cdot 25 \cdot 07975 \cdot 9992060 \cdot 4338 \cdot 0459442 \cdot 045992 \cdot 21.74256 \cdot 9989440 \cdot 2268 \cdot 0517550 \cdot 051824 \cdot 19.29592 \cdot 9986598 \cdot 051838 \cdot 045986 \cdot 051824 \cdot 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	Sine.	0468159	0471065	0473970	0476876	0479781	0482687	0485592	0488498	0491403	0494308	0497214	0500119	0503024	0505929	0508835	0511740	0514645	0517550	0520455	0523360	Cosine. Cotan.
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	Cotang.	24.36750	24-19571	24-02632	23-85927	23-69453	23-53205	23-37177	23-21366	23-05767	22-90376	22-75189	22.60201	22-45409	22-30809	22.16398	22-02171	21.88125	21.74256	21-60563	21.47040	Tang.
1	Tang.	-041038	041329	041621	041912	.042203	-042495	-042786	-043078	043369	043660	043952	044243	044535	044826	045118	045409	045701	045992	046284	046575	Cotan.
	Sine.	0410037	0412944	0415850	0418757	0421663	0424569	0427475	0430382	0433288	0436194	0439100	0442006	0444912	0447818	0450724	0453630	0456536	0459442	0462347	0465253	/ Cosine. Cotan.
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	Cosine.	9993908	-9993806	999370	.666360	-999349	.999339(828666-	-9993177	-9993068	.999296	999285	-999274(3595666-	-9992517	-9992404	636666-	9992176	9992066	-9991944	9991827	Sine.
	Cotang.	28-63625	28-39939	28-16642	27-93723	27-71174	27-48985	27-27148	27-05655	26.84498	56-63669	26-43160	26-22963	26-03073	25.83482	25-64183	25-45170	25-26436	25-07975	24.89782	24-71851	Tang.
1	Tang.	-034920	035212	035503	-035794	036085	036377	899980	036959	037250	037542	037833	038124	038416	038707	038998	039290	039581	039872	040164	040455	Cotan.
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Sine. Tang. Cotang.		Cotang.	15-53398	15-46381	15-39427	15-32535	15-25705	15-18934	15-12224	15-05572	14-98978	14-92441	14-85961	14-79537	14-73167	14-66852	14-60591	14-54383	14-48227	14-42123	14.36069	14.30066		
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NATURAL SINES AND TANGENTS TO A RADIUS 1.

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4 Deg.

4 Deg.

 $0.709171 + 0.71096 \\ 14.06545 + 9974822 \\ 15625 + 0.770091 \\ -0.770991 \\ -0.77238 \\ 12.94692 \\ -9970304 \\ 3545 + 0928082 \\ -0928082 \\ -0938082 \\ -093498 \\ -0938082$ $-0714974 \cdot 071680 \cdot 13 \cdot 95071 \cdot 9974408 \cdot 6427 \cdot 077589 \cdot 1977823 \cdot 12 \cdot 84955 \cdot 9969854 \cdot 3347 \cdot 0833880 \cdot 083679 \cdot 11 \cdot 95037 \cdot 9965172 \cdot 12 \cdot 9969854 \cdot 12 \cdot 9969854$ $\cdot 0717876 \cdot 071973 \cdot 13 \cdot 89404 \cdot 9974199 \cdot 5328 \cdot 0778791 \cdot 078116 \cdot 12 \cdot 80141 \cdot 9969628 \cdot 3248 \cdot 0836778 \cdot 083972 \cdot 11 \cdot 90864929 \cdot 112 \cdot$ 9966612 19 $14 \cdot 18209 \cdot 9975233 \mid 56233 \mid -0764290 \mid -076653 \mid 13.04576 \mid -9970750 \mid 3743 \mid -0822284 \mid -082507 \mid 12 \cdot 12006 \mid -9966135 \mid 17096 \mid -9966136 \mid 17096 \mid -9966136 \mid 17096 \mid -9966136 \mid 170966136 \mid 17096 \mid -9966136 \mid -9967136 \mid$ $\cdot 0720777 \cdot 072265 \cdot 13.83782 \cdot 9973990 \cdot | 5229 \cdot 0781691 \cdot 078409 \cdot | 12.75363 \cdot 9969401 \cdot | 3149 \cdot 0839677 \cdot 084265 \cdot | 11.86728 \cdot 9964655 \cdot | 11.86728 \cdot |$ $\cdot 0726580 | \cdot 072850 | 13 \cdot 72673 | \cdot 9973569 | 50 | 31 | \cdot 0787491 | \cdot 078994 | 12 \cdot 65912 | \cdot 9968945 | 29 | 51 | \cdot 0845474 | \cdot 084851 | 11 \cdot 78533 | \cdot 9964196 | 12 \cdot 084858 | \cdot 0848$ $\cdot 0729481 \cdot 07314313 \cdot 0797347 \cdot 0797337 \cdot 0790391 \cdot 079287 \cdot 12 \cdot 61239 \cdot 9968715 \cdot 2862 \cdot 0848373 \cdot 085144 \cdot 11 \cdot 74477 \cdot 9968948 \cdot 11 \cdot 07828 \cdot 11 \cdot 07828$ $\cdot 0746887 \cdot 074897 \\ 13 \cdot 35151 \cdot 9972069 \\ 43 \\ 38 \cdot 0807788 \cdot 081043 \\ 12 \cdot 33902 \cdot 9967321 \\ 12 \cdot 33902 \cdot 9967321 \\ 22 \\ 58 \cdot 0865762 \cdot 086902 \\ 11 \cdot 50715 \cdot 9962452 \\ 12 \cdot 399024 \cdot 9967321 \\ 12 \cdot 39902 \cdot 9967321 \\ 13 \cdot 39902 \cdot 9967321 \\ 14 \cdot 39902 \cdot 9967321 \\ 15 \cdot 3990$ $18 \cdot 0749787 \cdot 075190 \cdot 1329957 \cdot 9971851 \cdot 4239 \cdot 0810687 \cdot 081336 \cdot 1229460 \cdot 9967085 \cdot 2159 \cdot 0868660 \cdot 087195 \cdot 1146847 \cdot 9962200 \cdot 087197 \cdot 098188 \cdot 09818 \cdot 098188 \cdot 098188 \cdot 098188 \cdot 09818 \cdot 098188 \cdot 098188 \cdot 098188 \cdot 09818 \cdot 098188 \cdot 09818 \cdot 098188 \cdot 09818 \cdot$ $13 \cdot 0255283 \cdot 073727 \cdot 13 \cdot 56339 \cdot 9972931 \cdot 47734 \cdot 0796190 \cdot 079872 \cdot 12 \cdot 51994 \cdot 9968254 \cdot 2654 \cdot 0854169 \cdot 085730 \cdot 11 \cdot 66449 \cdot 9963453 \cdot 11 \cdot 6644 \cdot 11$ $19 \cdot 0.752688 \cdot 0.75492 \cdot 13 \cdot 24803 \cdot 9971633 \cdot 41140 \cdot 0813537 \cdot 081629 \cdot 12 \cdot 25050 \cdot 9966849 \cdot 20860 \cdot 0871557 \cdot 087488 \cdot 11 \cdot 43005 \cdot 9961947 \cdot 12 \cdot 25060 \cdot 9961947 \cdot 12 \cdot 25060 \cdot$ Cosine. $\cdot 0.732382 \cdot 0.73435 \cdot 13 \cdot 61740 \cdot 9973145 \cdot 48 \cdot 33 \cdot 0.793290 \cdot 0.79579 \cdot 12 \cdot 56599 \cdot 9968485 \cdot 2753 \cdot 0851271 \cdot 085437 \cdot 11 \cdot 70450 \cdot 9963701 \cdot 086437 \cdot 08647 \cdot 0$ $\cdot 0.741085 \cdot 0.74312 \cdot 13.45662 \cdot 9972502 \cdot 45136 \cdot 0801989 \cdot 080458 \cdot 12.42883 \cdot 9967789 \cdot 2456 \cdot 0859966 \cdot 086316 \cdot 11.56529 \cdot 9963954$ $\cdot 0.743986 \cdot 0.7460513 \cdot 40386 \cdot 9972286 \cdot 44137 \cdot 0804889 \cdot 080750 \cdot 12 \cdot 38376 \cdot 9967555 \cdot 2357 \cdot 0862864 \cdot 086609 \cdot 11 \cdot 54609 \cdot 9962704$ Sine. $\cdot 0697565 \cdot 069926 \mid 14\cdot30066 \cdot 997564 \mid |60|21 \cdot 0758489 \cdot 076068 \mid |3\cdot14612 \mid \cdot 9971193 \mid |39|41 \mid \cdot 0816486 \mid \cdot 081922 \mid |2\cdot20671 \mid |3\cdot14612 \mid \cdot 0816489 \mid |3\cdot14618 \mid |3\cdot1$ $\cdot 070219 | 14.24113 | \cdot 9975437 | 5922 | \cdot 0761390 | \cdot 076360 | 13.09575 | \cdot 9970972 | 3842 | \cdot 0819385 | \cdot 082215 | 12.16323 | \cdot 0819385 | \cdot 081938$ Cotang. Tang. Tang. Cosine. | Cotan, | Sine. ` _ Sine. Cosme. Cotang. Tang. Cosine. | Cotan. Tang. Sine. 0706270 070803 14.12353 9975028 5724 $-0755589 | -075775 | 13 \cdot 19698 | \cdot 9971413 | 40$ Cosine. Sine. Cotang. Tang. Tang. ·0703368|·0¶0511 Cosine. | Cotan. 0700467 Sine.

Ē		19	18	17	16	15	14	13	12	11	10	6	00	7	9	2	4	8	65	1	0		-	3
	Cosine.	-9950844	9950556	9950566	9949976	-9949685	-9349393	-9949101	-9948807	9948513	9948217	.9947921	-9947625	9947327	-9947028	9946729	-9946428	9946127	9945825	-9945523	9945219		Sine.	Dec. 84
	Cotang.	$0.9871557 \cdot 087488 \cdot 11 \cdot 43005 \cdot 9961947 \cdot 60 \times 1 \cdot 0933395 \cdot 093647 \cdot 10 \cdot 67834 \cdot 9956437 \cdot 3941 \cdot 0990303 \cdot 099519 \cdot 10 \cdot 04838 \cdot 9950844 \cdot 19888 \cdot 10 \cdot 0990303 \cdot 099519 \cdot 10 \cdot 04838 \cdot 04838 \cdot 10 \cdot 04838 \cdot 0$	$11 \cdot 39188 \cdot 9961693 \cdot 5932 \cdot 0935291 \cdot 093940 \cdot 10 \cdot 64499 \cdot 9956165 \cdot 3842 \cdot 0993197 \cdot 099813 \cdot 10 \cdot 01871 \cdot 9950556 \cdot 1888 $	$-0877353 \cdot 088074 \\ 11 \cdot 35397 \cdot 9961438 \\ 158 \cdot 23 \cdot 0933187 \cdot 094234 \\ 10 \cdot 61184 \cdot 9955892 \\ 37423 \cdot 0996092 \cdot 100107 \\ 9960266 \\ 17$	$-0880251 \cdot 0983368 \cdot 11 \cdot 31630 \cdot 9961183 \cdot 5724 \cdot 0941083 \cdot 094527 \cdot 10 \cdot 57889 \cdot 9955620 \cdot 3644 \cdot 0998986 \cdot 100400 \cdot 9 \cdot 960072 \cdot 9949976 \cdot 166767 \cdot 100400 \cdot 1004000 \cdot 100400 \cdot 10$	$0883148 \cdot 088661 \cdot 11 \cdot 27888 \cdot 9960926 \cdot 56 \cdot 25 \cdot 0943979 \cdot 094821 \cdot 10 \cdot 54615 \cdot 9955345 \cdot 3546 \cdot 1001881 \cdot 100694 \cdot 9931008 \cdot 9949686 \cdot 1500698 \cdot 1500$	$0.986046 \cdot 0.88954 \cdot 11 \cdot 24171 \cdot 9960669 \cdot 55 \cdot 26 \cdot 0946875 \cdot 095114 \cdot 10 \cdot 51360 \cdot 9955070 \cdot 3446 \cdot 1004775 \cdot 100988 \cdot 9 \cdot 902112 \cdot 9949393 \cdot 14 \cdot 12 \cdot 12 \cdot 12 \cdot 12 \cdot 12 \cdot 12 \cdot 12$	$0.9889943 \cdot 0.89247 \cdot 11 \cdot 20478 \cdot 9960411 \cdot 5427 \cdot 0.949771 \cdot 0.95408 \cdot 10 \cdot 48126 \cdot 9954794 \cdot 3347 \cdot 1007669 \cdot 101282 \cdot 9 \cdot 873382 \cdot 9949101 \cdot 13888 \cdot 10888943 \cdot 1088888 \cdot 10888888 \cdot 1088888 \cdot 1088888 \cdot 1088888 \cdot 1088888 \cdot 10888888 \cdot 108888888 \cdot 10888888 \cdot 1088888 \cdot 108888 \cdot 10888 \cdot 108888 \cdot 108888 \cdot 10$	$0.8991840 \cdot 0.89540 \cdot 11 \cdot 16808 \cdot 9960152 \cdot 5328 \cdot 0952666 \cdot 095701 \cdot 10 \cdot 44911 \cdot 9954517 \cdot 3218 \cdot 1010563 \cdot 101576 \cdot 9 \cdot 844816 \cdot 9948807 \cdot 1229 \cdot 1229$	$0.8994738 0.89834 11 \cdot 13163 \mid 9959892 5229 0.955562 0.955969 10 \cdot 41715 \cdot 9954240 3149 1013457 \cdot 101370 19 \cdot 816414 19948513 10 \cdot 816414 10 \cdot 8$	$-0897635 \cdot 090127 \cdot 11 \cdot 09541 \cdot 9959631 \cdot 51 \cdot 30 \cdot 0958458 \cdot 096289 \cdot 10 \cdot 38539 \cdot 9953962 \cdot 3050 \cdot 1016351 \cdot 102164 \cdot 9 \cdot 788173 \cdot 9948217 \cdot 100164 \cdot 1$	$10.0900532\cdot 090420 \\ 11.05943 \cdot 0959370 \\ 150 \\ 11 \cdot 0961353 \cdot 096582 \\ 10.35382 \cdot 9953683 \\ 2957 \cdot 9953683 \\ 2957 \cdot 1019245 \\ 1102458 \\ 9 \cdot 760092 \cdot 9947921 \\ 10.05458 \\ 10.05488 \\ 10.$	$ \bullet 9903429 \ \bullet 090713 \ 11 \cdot 02367 \cdot 9959107 \ 49 \ 32 \cdot 0964248 \ \bullet 096876 \ 10 \cdot 32244 \ \bullet 9953403 \ 28 \ 52 \cdot 1022138 \ \bullet 102752 \ 9 \cdot 732171 \ \bullet 9947635 \ 000713 \ 0007$	$12.0906326 \\ \cdot 091007 \\ 10.98815 \\ \cdot 9958844 \\ \cdot 48 \\ \cdot 33.0967144 \\ \cdot 097169 \\ \cdot 10.29125.9953122 \\ \cdot 27 \\ \cdot 53.1025032 \\ \cdot 1025032 \\ \cdot 103046 \\ \cdot 9947327 \\ \cdot $	$13 \cdot 0909223 \cdot 091300 \cdot 10 \cdot 95285 \cdot 9958580 \cdot 47 \cdot 34 \cdot 0970039 \cdot 097463 \cdot 10 \cdot 26024 \cdot 9952840 \cdot 2654 \cdot 1027925 \cdot 103339 \cdot 9 \cdot 676800 \cdot 9947028 \cdot 1087928 \cdot 108792$	$14.0912119 \cdot 091593 \cdot 10.91777 \cdot 9958315 \cdot 4635 \cdot 0972934 \cdot 097757 \cdot 10.22942 \cdot 9952557 \cdot 2555 \cdot 1030819 \cdot 103634 \cdot 9.649347 \cdot 9946729 \cdot 1030819 \cdot 103634 \cdot 10364 \cdot 10$	$15 \cdot 9915016 \cdot 991887 \cdot 10 \cdot 88292 \cdot 9958049 \cdot 45 \cdot 36 \cdot 9975829 \cdot 998050 \cdot 10 \cdot 19878 \cdot 9952274 \cdot 24 \cdot 56 \cdot 1033712 \cdot 103928 \cdot 9 \cdot 622048 \cdot 9946428 \cdot 9952274 \cdot 24 \cdot 56 \cdot 1033712 \cdot 103928 \cdot 9 \cdot 622048 \cdot 9946428 \cdot 9952274 \cdot 24 \cdot 56 \cdot 1033712 \cdot 103928 \cdot 9 \cdot 622048 \cdot 9946428 \cdot 9952274 \cdot 24 \cdot 56 \cdot 103712 \cdot 103928 \cdot 9 \cdot 622048 \cdot 9946428 \cdot 9952274 \cdot 24 \cdot 56 \cdot 103712 \cdot 103928 \cdot 99522048 \cdot 9952274 \cdot 24 \cdot 56 \cdot 103712 \cdot 103928 \cdot 9952204 \cdot 9952274 \cdot 24 \cdot 56 \cdot 103712 \cdot 103928 \cdot 9952204 \cdot 9952274 \cdot 24 \cdot 56 \cdot 103712 \cdot 103928 \cdot 9952204 \cdot 9952204 \cdot 9952274 \cdot 24 \cdot 56 \cdot 103712 \cdot 103928 \cdot 9952204 \cdot 9952204 \cdot 9952074 \cdot 9952074$	$16 \cdot 0917913 \cdot 092180 \cdot 10 \cdot 84828 \cdot 9957783 \cdot 44.37 \cdot 0978724 \cdot 098344 \cdot 10 \cdot 16833 \cdot 9951990 \cdot 2357 \cdot 1036605 \cdot 104222 \cdot 9 \cdot 594902 \cdot 9946127 \cdot 1036605 \cdot 104222 \cdot 10422 \cdot 104222 \cdot$	$17 \cdot 0920809 \cdot 092473 \cdot 10 \cdot 81387 \cdot 9957515 \cdot 43 \cdot 38 \cdot 0981619 \cdot 098638 \cdot 10 \cdot 13805 \cdot 9951705 \cdot 22 \cdot 58 \cdot 1039499 \cdot 104516 \cdot 9 \cdot 567906 \cdot 9945825 \cdot 9951705 \cdot 22 \cdot 58 \cdot 1039499 \cdot 104516 \cdot 9 \cdot 567906 \cdot 9945825 \cdot 9951705 \cdot 1049516 \cdot 104916 \cdot 10$	$18 \cdot 9923706 \cdot 992767 \mid 10 \cdot 77967 \cdot 9957247 \mid 42 \mid 39 \cdot 9984514 \cdot 698932 \mid 10 \cdot 10795 \mid \cdot 9951419 \mid 21 \mid 59 \mid \cdot 1042392 \mid \cdot 104810 \mid 9 \cdot 541061 \mid \cdot 9945523 \mid \cdot 8945523 \mid \cdot 8945233 \mid \cdot 8945523 \mid \cdot 8945623 \mid \cdot 8946623 \mid \cdot 8946623 \mid \cdot 8946623 \mid \cdot 8946623 \mid \cdot 8946233 \mid \cdot 8946623 \mid \cdot 894623 \mid \cdot 8946623 \mid $	$\frac{19}{19} \cdot 9926602 \cdot 993660 \cdot 10 \cdot 74568 \cdot 99569 \cdot 78 \cdot 41 \cdot 40 \cdot 9987408 \cdot 999225 \cdot 10 \cdot 07803 \cdot 9951132 \cdot 20 \cdot 160 \cdot 1045285 \cdot 105104 \cdot 9 \cdot 514364 \cdot 9945219$		Tang.	
5	Tang.	-099519	.099813	100107	100400	·100694	100988	101282	101576	.101870	.102164	102458	102752	103046	103339	103634	.103928	.104222	104516	.104810	105104		Cotan.	
	Sine.	0990303	0993197	2609660	9868660	1001881	1004775	1007669	1010563	1013457	1016351	1019245	1022138	1025032	1027925	1030819	1033712	1036605	1039499	1042392	1045285		Cosine.	
		39 41	38 42	37 43	36 44	35 45	34 46	33 47	32 48	3149	30 50	29 51	28 52	27 53	26 54	25 55	2456	23 57	22 58	21 591	09 02		,	100
	Cosine.	9956437	9956165	9955892	9955620	9955345	9955070	9954794	9954517	9954240	9953962	9953683	9953403	9953122	9952840	9952557	9952274	9951990	9951705	9951419	9951132		Sine.	D. 2.07
	Cotang.	10-67834	10-64499	10-61184	10-57889	10-54615	10-51360	10.48126	10-44911	10-41715	10-38539	10.35382	10.32244	10-29125	10-26024	10-22942	87891.01	10-16833	10-13805	10-10795	10.07803		Tang.	
	Tang.	-093647	093940	-094234	-094527	094821	095114	-095408	.095701	-095995	683960	-096582	928960	691160	-097463	757760-	09860	-098344	869860	098932	-099225		Cotan.	
	Sine.	0932395	0935291	0938187	0941083	0943979	0946875	0949771	0952666	0955562	0958458	0961353	0964248	0967144	0970039	0972934	0975829	0978724	6191860	0984514	8044860		, Cosme.	
		6021	58 69	58 23	5724	56 25	55 26	54 27	53 28	52 29	51 30	50 31	1932	1833	1734	16 35	. 98 9	1437	13 38	12 39	11 40	10	, ,	1
	Cosine.	9961947	9961693	9961438	-9961183	9260966	6990966-	9960411	9960152	9959892	9959631	9959370	9959107	9958844	0828266	9958315	9958049	9957783	9957515	9957247	9956978	8029266	Sine.	Dec 04
	Cotang.	11-43005	11.39188	11-35397	11.31630	11.27888	11-24171	11-20478	11-16808	11-13163	11-09541	11-05943	11.02367	10-98815	10-95285	10-91777	10.88292	10-84828	10-81387	10-77967	10-74568	10-71191	Tang.	
	Tang.	087488		088074	898880	199880	088954	089247	089540	089834	090127	090420	090713	001007	001300	091593	091887	092180	092473	192260	090860	093354	Cotan.	
ľ	Sine.	0871557	0874455 -087781	0877353	0880251	0883148	0886046	0888943	0891840	0894738	0897635	0900532	0903429	9269060	0909223	0912119	0915016	. 8162160	6080860	9023706	0926602	20 0929499 093354 10-71191 9956708 40	Cosine.	
		0	÷	63	00		5	9	7	œ	6	10	11	57	13	14	15	16	17	8	60	20.	-	

Tang. Cotang. Cosme.
$0.1045885.105104 \ 9.514364 \ \cdot 9945219 \ \ 9021 \cdot 1106017 \cdot 111284 \ \ 8.985984 \ \cdot 9938648 \ \ 993864$
$\cdot 1048178 \cdot 1053989 \cdot 9487814 \cdot 9944914 \cdot 5944914 \cdot 59122 \cdot 1108908 \cdot 111578 \cdot 962266 \cdot 9938326 \cdot 38 \cdot 12 \cdot 1166707 \cdot 117473 \cdot 8 \cdot 512594 \cdot 9931706 \cdot 11048178 \cdot 11$
$2.1051070 \cdot 1056929 \cdot 9.461411 \cdot 9944609 \cdot 5823 \cdot 1111799 \cdot 111873 \cdot 8.938672 \cdot 9938003 \cdot 3713 \cdot 1169596 \cdot 117767 \cdot 8.491277 \cdot 9931367$
$3 \cdot 1053963 \cdot 105986 \cdot 9 \cdot 435153 \cdot 9944303 \cdot 57 \cdot 24 \cdot 1114689 \cdot 112168 \cdot 8 \cdot 915200 \cdot 9937679 \cdot 36 \cdot 14 \cdot 1172485 \cdot 118062 \cdot 8 \cdot 470065 \cdot 9931026 \cdot 9937679 \cdot 36 \cdot 14 \cdot 1172485 \cdot 118062 \cdot 1$
$4 \cdot 1056856 \cdot 106280 \mid 9 \cdot 409038 \cdot 9943996 \mid 56 \mid 25 \mid 1117580 \mid 112462 \mid 8 \cdot 891850 \cdot 9937355 \mid 35 \mid 15 \cdot 11175374 \cdot 118357 \mid 8 \cdot 48957 \mid \cdot 9930686 \mid 1106286 \mid 11$
$5 \cdot 1059748 \cdot 106575 \cdot 9 \cdot 383066 \cdot 9943688 \cdot 55 \cdot 26 \cdot 1120471 \cdot 112757 \cdot 18 \cdot 868620 \cdot 9937029 \cdot 34 \cdot 16 \cdot 1178263 \cdot 118652 \cdot 18 \cdot 427953 \cdot 9930342 \cdot 18 \cdot 10000000000000000000000000000000$
$\cdot 1062641 \cdot 106869 \cdot 9 \cdot 357235 \cdot 9943379 \cdot 5427 \cdot 1123361 \cdot 1123361 \cdot 8845510 \cdot 9936703 \cdot 3317 \cdot 1181151 \cdot 118947 \cdot 8407051 \cdot 9929999$
$\cdot 1065533 \cdot 107163 \cdot 9\cdot 331545 \cdot 9943070 \cdot 5328 \cdot 1126252 \cdot 113346 \cdot 8\cdot 822518 \cdot 9936375 \cdot 3218 \cdot 1184040 \cdot 119242 \cdot 8\cdot 386251 \cdot 1184040 \cdot 11840$
$\cdot 1068425 \cdot 107457 \cdot 9 \cdot 305993 \cdot 9942760 \cdot 5229 \cdot 1129142 \cdot 113541 \cdot 8 \cdot 799644 \cdot 9936047 \cdot 3149 \cdot 1186928 \cdot 119537 \cdot 8 \cdot 365555 \cdot 9929310 \cdot 1126911 \cdot 11$
$\cdot 1071318 \cdot 107751 \cdot 9 \cdot 280580 \cdot 9942448 \cdot 51 \cdot 30 \cdot 1132032 \cdot 113935 \cdot 8 \cdot 776887 \cdot 9935719 \cdot 30 \cdot 50 \cdot 1189816 \cdot 119832 \cdot 8 \cdot 344955 \cdot 9928965 \cdot 1189818 \cdot 118981$
$0.1074210 \cdot 108046 \cdot 9.255303 \cdot 9942136 \cdot 50 \cdot 31 \cdot 1134992 \cdot 114230 \cdot 8 \cdot 754246 \cdot 9935389 \cdot 29 \cdot 51 \cdot 1192704 \cdot 120127 \cdot 8 \cdot 324457 \cdot 9928618 \cdot 8 \cdot 120127 \cdot 1201$
$-1077102 \cdot 108340$ $9 \cdot 230162 \cdot 9941823 \cdot 4932 \cdot 1137812 \cdot 114525$ $8 \cdot 731719 \cdot 9935058$ $2852 \cdot 1195593 \cdot 120423$ $8 \cdot 304058 \cdot 9928271$
$\textbf{2.1079994.108634} \\ \textbf{9.205156.9941510} \\ \textbf{4.83375179922.114819} \\ \textbf{8.709307.9934727} \\ \textbf{2.7153.1198481} \\ \textbf{1.20718} \\ \textbf{8.283757} \\ \textbf{9.9279922} \\ \textbf{9.9279922} \\ \textbf{9.9279922} \\ \textbf{9.9279922} \\ \textbf{9.9279922} \\ \textbf{9.927992} \\ \textbf{9.92799} \\ \textbf{9.927992} \\ \textbf{9.92792} \\ \textbf{9.927992} \\ \textbf{9.92799} \\ \textbf{9.927992} \\ \textbf{9.927992} \\ \textbf{9.927992} \\ \textbf{9.92792} \\ \textbf{9.92792} \\ \textbf{9.927992} \\ \textbf{9.92792} \\ \textbf{9.927992} \\ \textbf{9.92792} \\ 9$
$991082885 \cdot 108929 \cdot 190283 \cdot 9941195 \cdot 4784 \cdot 1143592 \cdot 115114 \cdot 8687008 \cdot 9934395 \cdot 2654 \cdot 1201368 \cdot 121013 \cdot 8263554 \cdot 9927573 \cdot 10882885 \cdot 10882885 \cdot 10888 \cdot 10888 \cdot 108888 \cdot 1088888 \cdot 10888888 \cdot 10888888 \cdot 10888888 \cdot 108888888 \cdot 1088888888 \cdot 1088888888 \cdot 10888888888 \cdot 10888888888 \cdot 1088888888 \cdot 1088888888 \cdot 108888888 \cdot 108888888 \cdot 108888888 \cdot 10888888 \cdot 10888888 \cdot 10888888 \cdot 1088888 \cdot 1088888 \cdot 1088888 \cdot 108888 \cdot 10888 \cdot 108888 \cdot 10888 \cdot 108888 \cdot 1088$
$4 \cdot 1085777 \cdot 109223 \cdot 9 \cdot 155543 \cdot 9940880 \cdot 4635 \cdot 1146482 \cdot 115409 \cdot 8 \cdot 664822 \cdot 9934062 \cdot 2555 \cdot 1204256 \cdot 121308 \cdot 8 \cdot 243448 \cdot 9947224 \cdot 120426 \cdot 1204256 \cdot 1204256 \cdot 1204256 \cdot 1204256 \cdot 120426 \cdot 120426$
$5.1088669 \cdot 109517 \cdot 9.130934 \cdot 9940563 \cdot 45 \cdot 36 \cdot 1149372 \cdot 115703 \cdot 8 \cdot 642747 \cdot 9933728 \cdot 24 \cdot 56 \cdot 1207144 \cdot 121603 \cdot 8 \cdot 223488 \cdot 9926873 \cdot 121603 \cdot$
$16 \cdot 1091560 \cdot 109812 \cdot 9 \cdot 106456 \cdot 9940246 \cdot 44 \cdot 37 \cdot 1152261 \cdot 115998 \cdot 8 \cdot 620783 \cdot 993393 \cdot 2357 \cdot 1210031 \cdot 121898 \cdot 8 \cdot 203523 \cdot 9926521 \cdot 1210031 \cdot 121898 \cdot 121898$
$7.1094452 \cdot 110106 \cdot 9.082107 \cdot 9939928 \cdot 43 \cdot 38 \cdot 1155151 \cdot 116293 \cdot 8 \cdot 598929 \cdot 9933057 \cdot 2258 \cdot 1212919 \cdot 122194 \cdot 8 \cdot 183704 \cdot 9926169 \cdot 9926169 \cdot 9936169 \cdot 9$
$18 \cdot 1097343 \cdot 110401 \cdot 9 \cdot 057886 \cdot 9939610 \cdot 42 \cdot 39 \cdot 1158040 \cdot 116588 \cdot 577183 \cdot 9932721 \cdot 2159 \cdot 1215806 \cdot 122489 \cdot 8 \cdot 163978 \cdot 9925816 \cdot 1215806 \cdot 122489 \cdot 1224806 \cdot 1224$
$\frac{49}{20} \cdot 1100234 \cdot 1106959999999999999999999999999999999999$
Cotan. Tang. Sine. ' Cosine.
Deg. 83.

•	7 Deg.				•-	7 Deg.	•			7	7 Deg.				1
	Sine.	Tang.	Cotang.	Cosine.		Sine.	Tang.	Cotang.	Cosine.	,Ι,	Sine.	Tang.	Cotang.	Cosine.	-
	0-1218693 -122784 8-144346 -9925462 60 21 -1279302 -128990 7-752536 -9917832 3941 -1336979 -134909 7-412397 -9910221	122784	8.144346	9925462	602	1279302	.128990	7-752536	9917832	3941	1336979	134909	7-412397	9910221	18
	$1 \cdot 1221581 \cdot 123079 \cdot 9 \cdot 124807 \cdot 9925107 \cdot 5925107 \cdot 1282186 \cdot 129285 \cdot 7 \cdot 734802 \cdot 9917459 \cdot 3842 \cdot 1339862 \cdot 135205 \cdot 7 \cdot 396159 \cdot 9909832 \cdot 1339862 \cdot 1339862 \cdot 1339862 \cdot 1339862 \cdot 1339867 \cdot 133987 \cdot$	123079	8-124807	-9925107	592	3-1282186	129285	7.734802	9917459	3842	1339862	135205	7-396159	9909832	18
	$\textbf{2-1224468} \cdot 123375 \cdot 8 \cdot 105359 \cdot 992475 \cdot 15823 \cdot 1255071 \cdot 129581 \cdot 7 \cdot 717148 \cdot 9917086 \cdot 37143 \cdot 1342744 \cdot 135501 \cdot 7 \cdot 379990 \cdot 9909442 \cdot 129981 \cdot 1299811 \cdot 129981 $	123375	8.105359	-9924751	582	3 1285071	129581	7.717148	9801166	3743	1342744	135501	7-379990	9909442	11
	$\textbf{3.1227355.123670} \\ \textbf{8.086004.9924394} \\ \textbf{5.724.1287956.129877} \\ \textbf{7.699573.9916712} \\ \textbf{3.9916712.3644.1345627} \\ \textbf{7.1345627} \\ \textbf{7.1345627} \\ \textbf{7.1345637} \\ 7.$	123670	8.086004	-9924394	57 24	1287956	129877	7.699573	-9916712	3644	1345627	135797	7-363891		9
-	$4 \cdot 1230241 \cdot 123965 \cdot 8 \cdot 066739 \cdot 9924037 \cdot 5625 \cdot 1290841 \cdot 130173 \cdot 7 \cdot 682076 \cdot 9916337 \cdot 3548509 \cdot 136094 \cdot 7 \cdot 347861 \cdot 9908659 \cdot 1569678 \cdot 12696869 \cdot 1269698 \cdot 126969 \cdot 126$	123965	8.066739	-9924037	562	11290841	130173	7.682076	-9916337	3545	$\cdot 1348509$	36094	7-347861	6598066	15
	$\textcolor{red}{5 \cdot 1233128 \cdot 124261 \mid 8 \cdot 047564 \mid \cdot 9923679 \mid 5526 \mid 1293725 \cdot 130469 \mid 7 \cdot 664658 \mid \cdot 9915961 \mid 3446 \mid \cdot 1351392 \mid \cdot 136390 \mid 7 \cdot 331898 \mid \cdot 9908266 \mid 146999 \mid \cdot 1361399 \mid \cdot 13613999 \mid \cdot 136139999 \mid \cdot 136139999 \mid \cdot 136139999 \mid \cdot 1361399999 \mid \cdot 136139999999999999999999999999999999999$	124261	8-047564	-9923679	5526	1-1293725	130469	7.664658	.9915961	3446	-1351392	136390	7-331898	9908066	14
_	$\pmb{6 \cdot 1236015 \cdot 124556} \pmb{8 \cdot 028479} \pmb{\cdot 9923319} \pmb{6 \cdot 427 \cdot 1296609 \cdot 130764} \pmb{7 \cdot 647317 \cdot 9915584} \pmb{3347 \cdot 1354274} \pmb{\cdot 136686} \pmb{7 \cdot 316004} \pmb{\cdot 9907873} \pmb{\cdot 990773} $	124556	8.028479	-9923319	542	1296609	130764	7.647317	-9915584	3347	1354274	136686	7.316004	9907873	8
	$\textcolor{red}{\textbf{7\cdot1238901}} \cdot \textbf{124952} \mid \textbf{8\cdot009483} \cdot \textbf{9922959} \mid \textbf{5328} \cdot \textbf{1299494} \mid \textbf{131060} \mid \textbf{7\cdot630053} \cdot \textbf{9915206} \mid \textbf{3248} \mid \textbf{1357156} \mid \textbf{136983} \mid \textbf{7\cdot300178} \mid \textbf{9907478} \mid \textbf{1228901} \mid \textbf{1238901} \mid$	124852	8.009483	-9922959	5325	1299494	131060	7.630053	9915206	3248	1357156	36983	7-300178	9907478	12
_	$8 \cdot 1241788 \cdot 125147 7990575 \cdot 9922599 5229 \cdot 1302378 \cdot 131356 7612865 \cdot 9914828 3149 \cdot 1360038 \cdot 137279 7284418 \cdot 9907083 12719 \cdot 1360038 \cdot 137279 7284418 \cdot 9907083 12719 \cdot 1360038 \cdot 137279 7284418 \cdot 1360038 728418 \cdot 1360038 728418 \cdot 1360038 \cdot 137279 728418 \cdot 1360038 728418 \cdot 13600038 728418 \cdot 13600038 7$	125147	7 990575	-9922599	5225	1302378	131356	7.612865	-9914828	3149	1360038	37279	7-284418	9907083	11
	$9 \cdot 1214674 \cdot 125442 \right 7 \cdot 971756 - 9922237 \right 51 30 \cdot 1305262 \cdot 131652 \right 7 \cdot 595754 \cdot 9914449 \right 30 50 \cdot 1362919 \cdot 137575 \right 7 \cdot 268725 \cdot 9906687 \right 7 \cdot 1206687 \right 7 \cdot 12067 $ $ 7 \cdot 12067 \right 7 \cdot 12067 \right 7 \cdot 12067 $	125442	7-971755	-9922237	5130	1305262	131652	7-595754	.9914449	3050	1362919	37575	7-268725	9906687	9
=	$0 \cdot 1247560 \cdot 125738 \right. 7 \cdot 953022 \cdot 9921874 \\ 50 \overline{)31} \cdot 1308146 \cdot 131948 \right. 7 \cdot 578717 \right. \cdot 9914069 \\ 29 \overline{)31} \cdot 136580 \overline{)37872} \right. 7 \cdot 253098 \cdot 9906290 \overline{)37872} \\ 7 \cdot 253098 \cdot 9906290 \overline{)37872} \right. 7 \cdot 253098 \cdot 9906290 \overline{)37872} \\ 7 \cdot 253098 \cdot 9906290 \overline{)37872} \right. 7 \cdot 253098 \cdot 9906290 \overline{)37872} \\ 7 \cdot 253098 \cdot 9906290 \overline{)37872} \right. 7 \cdot 253098 \cdot 9906290 \overline{)37872} \\ 7 \cdot 253098 \cdot 990629)3787$	125738	7-953022	-9921874	5031	1308146	.131948	7.578717	-9914069	2951	1365801	37872	7-253098	9906290	6
Ξ	$1 \cdot 1250446 \cdot 126033 \cdot 7934375 \cdot 9921511 \ 4992 \cdot 1311030 \cdot 132244 \cdot 7 \cdot 561756 \cdot 9913689 \cdot 2652 \cdot 1368683 \cdot 138168 \cdot 7 \cdot 237537 \cdot 9905893 \cdot 138888 \cdot 128888 \cdot 1288888 \cdot 1288888 \cdot 1288888 \cdot 12888888 \cdot 1288888 \cdot 128888 \cdot 1288888 \cdot 128888 \cdot 128888 \cdot 1288888 \cdot 128888 \cdot 1288888 \cdot 128888 \cdot 128888 \cdot 128888 \cdot 128888 \cdot 1288$	126033	7-934375	1121266	4932	1311030	.132244	7-561756	-9913688	28 52	1368683	138168	7-237537	9905893	00
=	$\textbf{2} \cdot \textbf{1253332} \cdot \textbf{126329} \ \textbf{7\cdot915815} \cdot 9921147 48 \textbf{33} \cdot \textbf{1313913} \cdot \textbf{132540} \\ \textbf{7\cdot5125332} \cdot \textbf{9905494} \\ $	126329	7.915815	9921147	4833	1313913	132540	7.544869	-9913306	2753	1371564	138465	7.222042	9905494	7
<u> </u>	$3 \cdot 1256218 \cdot 126624 \cdot 7\cdot 897339 \cdot 9920782 \cdot 47 \cdot 34 \cdot 1316 \cdot 97 \cdot 132836 \cdot 7\cdot 528057 \cdot 9912923 \cdot 26 \cdot 34 \cdot 1374445 \cdot 13876 \cdot 7\cdot 206611 \cdot 9905095 \cdot 9912923 \cdot 26 \cdot 34 \cdot 1374445 \cdot 13876 \cdot 7\cdot 206611 \cdot 9905095 \cdot 9912923 \cdot 26 \cdot 34 \cdot 374445 \cdot 37445 \cdot$	126624	7-897339	9920782	4734	1316797	132836	7.528057	.9912923	2654	1374445	138761	7.206611	9905095	e
7	$ 4 1259104\cdot126920 7\cdot878948 \cdot9920416 46 35 \cdot1319631 \cdot133132 7\cdot511317 \cdot9912540 25 5 \cdot1377327 \cdot139058 7\cdot191245 \cdot9904694 36969 36969 36969 36969 36969 36969 36969 36969 36969 36969 3696 36969 36969 3696 36969 36969 3696 36969 36969 36969 36969 3696 36969 36$	126920	7.878948	-9920416	4635	1319681	.133132	7.511317	9912540	25 55	1377327	139058	7.191245	9904694	2
≓ Digit	$ \begin{array}{c} \textbf{(5)1261990} & \textbf{(127216)} & \textbf{(7)860642} \\ \textbf{(2)920049} & \textbf{(45)86} & \textbf{(1322564)} & \textbf{(133128)} \\ \textbf{(2)4261} & \textbf{(9912155)} & \textbf{(24)56} & \textbf{(1380208)} & \textbf{(138954)} \\ \textbf{(2)1261990} & \textbf{(2)126156} & \textbf{(2)1280208} \\ \textbf{(2)126198} & \textbf{(2)1280208} & \textbf{(2)1280208} \\ \textbf{(2)1280208} & \textbf{(2)1280208} \\ \textbf{(2)1280208} & \textbf{(2)1280208} \\ \textbf{(2)1280208} & \textbf{(2)1280208} \\ \textbf{(2)1280208} & (2)1280$	127216	7.860642	-9920049	<u>4536</u>	1322564	133428	7-494651	9912155	24 56	1380208	139354	7.175943	9904293	4
z ized	$ \left 6 \right 1264275 \cdot 127511 \right 7\cdot842419 \cdot 9919632 \left 4437 \cdot 1325447 \right \cdot 133724 \right 7\cdot478057 \cdot 9911770 \left 2357 \cdot 1383089 \right \cdot 138651 \right 7\cdot160705 \left \cdot 9903891 \right $	1127211	7.842419	-991663	4437	1325447	133724	7-478057	9911770	2357	1383089	139621	7-160705	9903891	က
by ($17 \cdot 1267761 \cdot 127807 \mid 7 \cdot 824279 \mid \cdot 9919314 \mid 43 \mid 38 \mid \cdot 1328330 \mid \cdot 134020 \mid 7 \cdot 461535 \mid \cdot 9911384 \mid 22 \mid 58 \mid \cdot 1385970 \mid \cdot 139947 \mid 7 \cdot 145530 \mid \cdot 9903489 \mid 7 \mid 7 \cdot 145530 \mid 1 \mid 145530 \mid 145530 \mid 1 \mid 1455300 $	127807	7.824279	9919314	<u>4338</u>	1328330	134020	7-461535	-9911384	22 58	1385970	139947	7.145530	9903489	C4
Ğ	$8 1270646 128103 7 \cdot 806221 \cdot 9918944 42 39 \cdot 1331213 \cdot 134316 7 \cdot 445085 \cdot 9910997 21 59 \cdot 1338850 \cdot 140244 7 \cdot 130419 \cdot 9903085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 1200085 39 39 1200085 $	128103	7.806231	·9918944	4239	1331213	134316	7-445085	1660166	21 59	1388820	140244	7.130419	9903085	_
<u>≈</u> 6	$\textcolor{red}{\mathbf{9\cdot 1273531\cdot 128398}} \textcolor{blue}{\mathbf{7\cdot 789245\cdot 9918574}} \textcolor{blue}{\mathbf{4\cdot 1400\cdot 1334096\cdot 134612}} \textcolor{blue}{\mathbf{7\cdot 428706\cdot 9910610}} \textcolor{blue}{\mathbf{20\cdot 601\cdot 1391731\cdot 140540}} \textcolor{blue}{\mathbf{7\cdot 115369\cdot 990268}} \textcolor{blue}{\mathbf{9\cdot 90268}} \textcolor{blue}{13910610} $	128398	7.788245	9918574	4146	1334096	134612	7.428706	0190166	20 60	1391731	140540	7.115369	9902681	•
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\cdot 12$ $\cdot 1403252 \cdot 141727 / 7\cdot 055790 | \cdot 9901055 | 5625 \cdot 1463708 \cdot 147964 | 6\cdot 758382 \cdot 9892298 | 3545 \cdot 1521234 \cdot 153914 | 6\cdot 497104 \cdot 9883615 | 11601234 \cdot 1160124 \cdot 1160$ $27 \cdot 1469463 \cdot 148559 \cdot 6 \cdot 731334 \cdot 9891445 \cdot 3347 \cdot 1526984 \cdot 154510 \cdot 6 \cdot 472059 \cdot 9882728 \cdot 12469463 \cdot 148559 \cdot 124510 \cdot 12$ 6-434842 9881392 $\cdot 1406132 \cdot 142024 \mid 7 \cdot 041048 \mid 9900646 \mid 5526 \cdot 1465385 \cdot 148261 \mid 6 \cdot 744831 \mid 9891872 \mid 3446 \mid 1524109 \mid 154212 \mid 6 \cdot 484558 \mid 9883172 \mid 9891872 \mid 989182 \mid 9891872 \mid 989$ $8 \cdot 1414772 \cdot 142914 \cdot 6 \cdot 997180 \cdot 9899415 \cdot 5229 \cdot 1475217 \cdot 149153 \cdot 6 \cdot 704496 \cdot 9890588 \cdot 3149 \cdot 1532733 \cdot 155106 \cdot 6 \cdot 447201 \cdot 9881838 \cdot 10881838 \cdot 1088188 \cdot 108818 \cdot$ $\cdot 1411892 \cdot 142617 / 7 \cdot 011744 \cdot 9899826 \cdot |53/28| \cdot 1472340 \cdot 148856 \cdot |6717889| \cdot 9891017 \cdot |3248| \cdot 1529858 \cdot 1529858 \cdot |6459607 \cdot 9882284 \cdot |645967 \cdot$ (1538482 | 155701 | 6-422530 | 9880945 $11 \cdot 1423410 \cdot 143805 \cdot 6 \cdot 953847 \cdot 9598177 \cdot 49 \cdot 32 \cdot 1483848 \cdot 150045 \cdot 6 \cdot 664630 \cdot 9889297 \cdot 28 \cdot 52 \cdot 1541356 \cdot 155999 \cdot 410263 \cdot 9880497 \cdot 38 \cdot 128 \cdot 12$ 53 -1544230 -156297 6-398042 -9880048 $13.1429168 \cdot 144399 \cdot 6 \cdot 925248 \cdot 9897347 \cdot 47734 \cdot 1489601 \cdot 150640 \cdot 6 \cdot 638310 \cdot 9888432 \cdot 26 \cdot 54 \cdot 1547104 \cdot 156595 \cdot 6 \cdot 38586 \cdot 9879599 \cdot 104739 \cdot$ $14 \cdot 1432047 \cdot 144696 \cdot 6 \cdot 911035 \cdot 9896931 \cdot 46 \cdot 35 \cdot 1492477 \cdot 150938 \cdot 6 \cdot 625225 \cdot 9887998 \cdot 25 \cdot 55 \cdot 1549978 \cdot 156893 \cdot 6 \cdot 373735 \cdot 9879148 \cdot 156898 \cdot 15689 \cdot 156898 \cdot 1568$ $15 \cdot 1434926 \cdot 144993 \cdot 6 \cdot 896879 \cdot 9896514 \cdot 45136 \cdot 1495353 \cdot 151235 \cdot 6 \cdot 612191 \cdot 9887564 \cdot 24156 \cdot 1552851 \cdot 157191 \cdot 6 \cdot 361650 \cdot 9878697 \cdot 157191 \cdot 1571919 \cdot 157191 \cdot 157191 \cdot 157191 \cdot 157191 \cdot 157191 \cdot 157191 \cdot 1571919 \cdot 157191 \cdot 157191 \cdot 157191 \cdot 157191 \cdot 157191 \cdot 15719 \cdot 157191$ $16.1437805 \cdot 145290 \cdot 6\cdot882780 \cdot 9896096 \cdot 44 \cdot 37 \cdot 1498230 \cdot 15153 \cdot 6\cdot599208 \cdot 9887128 \cdot 23 \cdot 57 \cdot 1555725 \cdot 157490 \cdot 6\cdot349609 \cdot 9878245 \cdot 127490 \cdot 127$ $13440684 \cdot 145587 \cdot 6 \cdot 868737 \cdot 9895677 \cdot 4238 \cdot 1501106 \cdot 151830 \cdot 6 \cdot 586273 \cdot 9886692 \cdot 1258598 \cdot 1558598 \cdot 157788 \cdot 6 \cdot 337612 \cdot 9877792 \cdot 1240684 \cdot 124068 \cdot$ $18^{\circ}1443562^{\circ}145884^{\circ}6\cdot854750^{\circ}9895258^{\circ}42^{\circ}39^{\circ}1503981^{\circ}152128^{\circ}6\cdot573389^{\circ}9886255^{\circ}21^{\circ}59^{\circ}1561472^{\circ}158086^{\circ}6\cdot325660^{\circ}98773388^{\circ}8886625^{\circ}21^{\circ}89866^{\circ}32666^{\circ}88686^{\circ}88686^{\circ}8868878^{\circ}888688^{\circ}888688^{\circ}888888^{\circ}8888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}8888^{\circ}8888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}88888^{\circ}8888^{\circ}88888^{\circ}8888^{\circ}88888^{\circ}88888^{\circ}8888^{\circ}88888^{\circ}8888^{\circ}8888^{\circ}88888^{\circ}8888^{\circ}88888^{\circ}8888^{\circ}8888^{\circ}88888^{\circ}888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}888^{\circ}8888^{\circ}8888^{\circ}888^{\circ}888^{\circ}888^{\circ}8888^{\circ}8888^{\circ}8888^{\circ}888^{\circ}$ 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Tang. 30 1478094 149451 6 691156 9890159 30 50 1535607 155404 40-1506857 152426 6-560553 9885817 20 60 1564345 158384 Cotan, Sine. / Cosine. $10 \cdot 1420531 \cdot 143508 \cdot 6 \cdot 968233 \cdot 9898590 \cdot 5031 \cdot 1480971 \cdot 149748 \cdot 6 \cdot 677867 \cdot 9889728 \cdot 2951 \cdot 1480971 \cdot 1$ $12 \cdot 1426289 \cdot 144102 \cdot 6 \cdot 939519 \cdot 9897762 \cdot 1833 \cdot 1486724 \cdot 150343 \cdot 651444 \cdot 9888865 \cdot 27$ Tang. Cosine. Cotan. 1409012 142321 7.026366 9900237 54 9 1417651 143211 6-982678 9899003 51 19 1446440 146181 6 840819 9894838 41 Sine. Tang. Cosine, Cotan.

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1638129 - 165847 6 -029624 - 9865246 35 46 - 1690628 - 171331 5 - 19577 9865050 - 1578708 - 159378 6 -25885 - 9874598 5 5 2 6 - 1638129 - 165846 5 - 166174 6 - 266352 - 172230 5 - 199440 - 9854574 - 168170 6 - 166174 6 - 2662362 - 172230 5 - 199440 - 9854574 - 166174 6 - 2622034 - 9873578 5 - 164178 8 - 166174 6 - 2662362 - 177230 5 - 789382 - 9854079 - 166174 6 - 2662362 - 164178 6 - 164178	32 5-840011 31 5-840011 31 5-819657 30 5-809531 30 5-799440 30 5-789382 29 5-779388	58.23 - 102.02.03 - 104.821 0.00.6230 59.00 10.00.8230 10.00.8230 59.00 10.00.8230 50.00 10.00.8230 50.00 10.00.8230 50.00 10.00.8230 50.00 10.00.8230 10.00.	$\begin{array}{c} 1.507210 \\ 1.50$	$\frac{1}{1507001} \frac{150392}{150392} \frac{150392}{150392} \frac{150392}{150392} \frac{150392}{150392} \frac{150302}{150392} \frac{150302}{1503$	1-1507019 155980 677828 155976 15782 155980 155570 15782 158980 15782 158980 15782 158980 15782 158980 158976 15782 158980 158976 15782 158980 158976 158980 158976 158980 158976 158980 158976 158980 158976 158980 158976 158980	58.23 - 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	Cotang.	6.073397	6.062396	6-051434	6-040510	6.090694	1 40040	6.018777	6-018777	6-018777 6-007967 5-997195	6.018777 6.007967 5.997195 5.986461	6.018777 6.007967 5.997195 5.986461 5.975764	6.018777 6.007967 5.997195 5.986461 5.975764 5.965104	6.007967 6.007967 5.997195 5.986461 5.975764 5.965104 5.954481	6.018777 6.007967 5.997195 5.986461 5.965104 5.954481 5.954481	6.018777 6.007967 5.997195 5.986461 5.965104 5.954481 5.954481 5.943895	6-018777 6-018777 6-097195 5-987195 5-965104 5-95481 5-913895 6-9333345	6.018777 6.007967 5.997195 5.986461 5.965104 5.965481 5.913895 5.913895 5.912353	6.018777 6.007967 5.997195 5.986461 5.965104 5.965104 5.9633345 5.9333345 5.92833 5.912355 5.912355	6-0187777 6-007967 5-997195 5-975764 5-954814 5-954818 5-913895 5-92833 5-92833 5-9191913 5-91508	6.0187777 6.007967 5.997195 5.986461 5.975764 5.95764 5.913895 5.912385 5.912385 5.912385 5.912385 5.912385 5.912385 5.912385	6-0187777 6-007967 5-997195 5-986461 5-955764 5-953345 5-913895 5-913895 5-912835 5-912835 5-912835 5-91836 5-919191 5-881138	6-0187777 6-007967 6-097195 5-986461 5-957764 5-9513895 5-913895 5-922832 5-922832 5-912855 5-912855 5-912855 5-912855 5-912858
	Tang.	164652	.164951	165250	165518	165847		166146	·166146 ·166445	166146 166445 166744	.166146 .166445 .166744 .167043	.166146 .166445 .166744 .167043	.166146 .166445 .166744 .167043 .167342	.166146 .166445 .166744 .167043 .167342 .167641	.166146 .166445 .166744 .167043 .167342 .167641 .167940	.166146 .166445 .166744 .167043 .167342 .167641 .167940 .168239 .168239	.166146 .166445 .167043 .167342 .167342 .167341 .167340 .168239 .168239	.166146 .166445 .167043 .167342 .167342 .167340 .168239 .168239 .168539 .168539	166146 166445 166444 1167043 1167342 1167342 1167342 1167343 1168239 1168239 1168239 1168239 1168239 1168239 1168239	166146 166445 166444 1167043 1167342 1167342 1167342 1168239 1168239 1168239 1168239 1168239 1169137 1169135	166146 166445 167043 167043 167040 167342 167340 168239 168239 168239 168239 168239 16838 16838 16838 16936 16936	. 166146 . 166445 . 166744 . 167342 . 167343 . 167349 . 168239 . 168239 . 168239 . 169338 . 169338 . 169338	- 166146 - 166445 - 167043 - 167342 - 167342 - 167342 - 168239 - 168239 - 168239 - 168239 - 16833 - 169335 - 170035
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-	Cosine, '	9876883	-9876428 5	9875972	9875514 3	-9875057 5	9874598 5		9874138 5	9874138 5	-9874138 5 -9873678 5	9874138 5 9873678 5 9873216 6	9874138 5 9873678 5 9873216 5	9874138 5 9873678 5 9873716 5 9872754 5 9872291 5	9873216 9873216 9873216 9872754 9872291 9871887 9871363	9873678 5 9873216 5 9873216 5 9873216 5 9872291 5 9871887 4 9871363 4 9871363 4	9874138 5 9873216 5 9872754 5 9872754 5 9872759 1 5 9871863 4 9871864 4 9871864 4 9871864 4 9871864 4 9871864 4 9871864 4 9871864 4 9871864 4 9871864 4 9871	9874138 5 9873216 5 9873219 5 9873291 5 9872291 5 9871363 4 9871363 4 9870431 11	987318 5 987316 5 987324 5 9872291 5 9872291 5 9871363 4 9871363 4 9871363 4 987963 4	987373678 98737367 98737316 9872731 9872731 9871827 9871827 9870837 9870431 9870431 986904 986904 986904	987315 5 987315 5 987315 5 987315 5 987315 5 987315 5 987315 5 9871363 4 9871363 4 9870431 1 9869519 6 986996 4 98688557 4 98888557 4	9874138 5 9873678 5 9873678 5 9873754 5 9872754 5 9872891 5 9871827 4 9871827 4 9870431 1 9869964 1 98689577 4 98685577 4 98689577	6-1581581 -160174 6-243208 -9874138 54 7-1584453 -160472 5-231600 -9873678 53 8-1598725 -160472 6-238210 -987274 55 10-1599069 -161367 6-298210 -987274 51 11-1595840 -161366 6-185586 -9871887 49 12-1598812 -161364 6-174186 -9871887 49 13-160455 -16256 6-18588 -9871881 48 15-160426 -16286 6-110230 -9869964 15 15-1607426 -162860 6-130230 -9869964 15 15-1607426 -163867 6-110779 4-9869027 43 17-1613167 -163457 6-117794 -9869027 43 18-1613038 -16353 -984438 -9867615 46
The second name of the second na	Cotang.	6-313751	6.301886	6-290065	6.278286	6-266551	6-251858		6.243208	6.243208	6-243208 6-231600 6-220034	6-243208 6-231600 6-220034 6-208510	6 1581581 160174 6°243208 9874138 77-1584458 160472 6°230034 9873216 9873216 9.1587325 160476 6°230034 9873216 9.1593069 1616069 6°208510 9872754 0~1593069 161867 66197027 9872229 0~1593069 161867 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0~1593069 0	6-231600 6-231600 6-23034 6-208510 6-197027	6.243208 6.231600 6.238510 6.197027 6.18586 6.174186	6.243208 6.231600 6.238510 6.197027 6.185586 6.174186	-581581 -160174 (**243208 -9874138 -1587453 -160172 (**24321 600-9873678 -1587426 -15973216 -15959069 -161969 (**518526 -987279 -15959069 -161964 (**174186 -9871363 -1598812 -161964 (**174186 -9871363 -1601853 -162261 (**151508 -9871683 -1601853 -162261 (**151508 -9870483 -1601853	6-28308 6-231600 6-23034 6-197027 6-18558 6-174186 6-174186 6-174186 6-174186 6-174186	6-283208 6-231600 6-208510 6-185506 6-18586 6-174186 6-17508 6-110230 6-128992	6-243208 6-231600 6-208510 6-18520 6-18586 6-174186 6-174186 6-110230 6-110230	6-243208 6-231600 6-208510 6-208510 6-185586 6-174186 6-174186 6-174186 6-174186 6-174186 6-174186 6-174186 6-174186 6-174186 6-174186 6-174186 6-174186 6-174186	6-243208 6-231600 6-23034 6-23034 6-185586 6-174186 6-151508 6-151508 6-117794 6-117794 6-117794	6-243208 6-231600 6-231600 6-230034 6-185586 6-18586 6-174186 6-174186 6-11508 6-110230 6-117794 6-117794 6-117794
	Tang.	158384	158682	158980	.159279	159577	159875	The last of the last	160174	160174	-160174 -160472 -160770	160174 160472 160770 161069	160174 160472 161069 161069	160174 160472 160770 161069 161367	160174 160472 160770 161069 161367 161666	160174 160472 161069 161367 161367 161367 161364	160174 160172 160770 161367 161367 161964 161964 162263	160174 160172 160177 161069 161867 161864 161864 162263 162263 162263 162263 162263	160174 160172 160177 161069 161867 161964 162263 162263 162263 162263 162263 162263 162263 162263 162263 162263	160174 160472 161867 161867 161866 161964 162263 162263 162263 162263 162263 162263 162263 162263	160174 160472 160770 161367 161367 161364 162263 162263 162261 162261 163260 163260 163260 163260	160174 160472 161069 161367 161367 161366 162263 162261 162261 162261 162361 163159 163159	160174 160472 160470 161867 161867 161867 161867 162867 162867 163159 163159 164455 164455
	Sine.	1564345	1567218	1570091	1572963	1575836	1578708	10000000	190 801	1581581	1581581 1584453 1587325	1581581 1584453 1587325 1590197	1581581 1584453 1587325 1590197 1593069	1581581 1584453 1587325 1590197 1593069 1595940	1581581 1584453 1587325 1590197 1593069 1595940 1598812	1584453 1587325 1590197 1593069 1595940 1598812 1601683	1581581 1584453 1587325 1590197 1595940 1598812 1601683 1604555	-1581.581 -1587325 -1593069 -1593069 -1598912 -1601683 -1604555	-1581581 -1584453 -1587325 -1593069 -1593069 -15930812 -1601683 -1604555 -1604565 -1607426	1581581 1587453 1587325 1593069 1593069 1598812 1601683 1607426 1607426	1581581 1584453 1587325 1593069 1595940 1595940 1595940 1601683 1604555 1604555 16107426 16107426 16107436 16107436	1581581 1584453 1584453 1593069 1593069 1598812 1601683 1610297 1610297 161038	1581581 1587325 1597325 1593069 1593069 1598812 1601683 1607426 1613167 1613167 1613167 1613167
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P	Sine.	Tang.	Cotang.	Cosine.	1	Sine.		Tang.	Cotang.	Cosine.	, ,	Sine.	Tang.	Cotang.	Cosine.	
•	36482	0 -1736482 -176327	5-671281	-9848078	602	1796	205	182632	5-475478	3-671281 -9848078 6021 -1796607 -182632 5-475478 -9837286 3941 -1853808 -188650 5-300801	3941	1853808	188650	5-300801	9826668	19
1-	39346	176626	5-661650	-9847572	592	2-17994	169	182933	5-466481	1739346 176626 5 661650 9847572 5922 1799469 182933 5 466481 9836763 3842 1856666 188952 5 292350 9826128	3842	1856666	188952	5-292350	-9826128	18
-	42211	176926	5.652051	-9847066	582	3-1802	330	183233	5-457512	$-1742211 - 176926 \cdot 652051 + 9847066 \cdot 5823 + 1802330 - 183233 \cdot 5457512 \cdot 9836239 \cdot 3743 + 185954 - 189253 \cdot 5283925 - 9825587 \cdot 189211 \cdot 189211$	3743	1859524	189253	5-283925	9825587	17
-	45075	177226	5-642483	9846558	57 2	1 1805	191	183534	5-448571	$\cdot 1745075 \cdot 177226 \cdot 5 \cdot 6242483 \cdot 9846558 \cdot 5724 \cdot 1805191 \cdot 183534 \cdot 544857 \cdot 19835715 \cdot 3644 \cdot 1862382 \cdot 189554 \cdot 527555 \cdot 9825046 \cdot 189574 \cdot $	3644	1862382	189554	5.275525	-9825046	16
-	47939	177527	5-632947	-9846050	562	5 18080	052	183835	5-439659	$\cdot 1747939 \cdot 177527 \cdot 5-632947 \cdot 9846050 \cdot 5625 \cdot 1808052 \cdot 183835 \cdot 5-439659 \cdot 9835189 \cdot 3545 \cdot 1865240 \cdot 189855 \cdot 5-267151 \cdot 9824504 \cdot 189855 \cdot 1865240 \cdot 189855 \cdot 1865240 \cdot 188855 \cdot 186620 \cdot 186600 \cdot 1866$	3545	1865240	189855	5-267151	-9824504	15
7	50803	177827	5.623442	9845542	552	9-1810	913	184135	5-430775	$\cdot 1750803 \cdot 177827 \cdot 5623442 \cdot 9845542 \cdot 5526 \cdot 1810913 \cdot 184135 \cdot 5430775 \cdot 9834663 \cdot 3446 \cdot 1868098 \cdot 190157 \cdot 5.258803 \cdot 9823961$	34 46	1868098	190157	5-258803	.9823961	14
17	753667	178127	5-613968	9845032	54 2	7-1813	774	184436	5-421918	$\cdot 1753667 \cdot 178127 \cdot 5 \cdot 613968 \cdot 9845032 \cdot 5427 \cdot 1813774 \cdot 184436 \cdot 5 \cdot 421918 \cdot 9834136 \cdot 3347 \cdot 1870956 \cdot 190458 \cdot 5 \cdot 250480 \cdot 9823417 \cdot 1870956 \cdot 190458 \cdot 19$	33 47	1870956	190458	5.250480	9823417	13
17	56531	178427	5.604524	-9844521	53 2	8-1816	635	184737	5-413090	$\cdot 1756531 \cdot 178427 \cdot 5604524 \cdot 9844521 \cdot 5328 \cdot 1816635 \cdot 184737 \cdot 5413090 \cdot 9833608 \cdot 3248 \cdot 1873813 \cdot 190760 \cdot 5242183 \cdot 9822873 \cdot 1875631 \cdot 1873813 \cdot 190760 \cdot 1$	32 48	1873813	190760	5.242183	.9822873	12
17	59395	178727	5-595112	.9844010	52 25	9 -1819	495	185038	5-404290	$-1759396 \cdot 178727 \cdot 5 \cdot 595112 \cdot 9844010 \cdot 6229 \cdot 1819495 \cdot 185038 \cdot 5 \cdot 404290 \cdot 9833079 \cdot 3149 \cdot 1876670 \cdot 191061 \cdot 5 \cdot 233911 \cdot 9823327 \cdot 187698 \cdot 1876$	3149	1876670	190161	5-233911	.9822327	Ξ
17	62258	179027	5-585730	.9843498	513	0-1822	355/	185339	5-395517	$\cdot 1762258 \cdot 179027 \cdot 5\cdot585730 \cdot 9843498 \cdot 51 \cdot 30 \cdot 182335 \cdot 185339 \cdot 5\cdot395517 \cdot 9832549 \cdot 30 \cdot 50 \cdot 1879528 \cdot 191363 \cdot 5\cdot225664 \cdot 9821781 \cdot 191363 \cdot 1913$	30 50	1879528	191363	5-225664	.9821781	10
17	65121	179327	5-576378	.9842985	503	1-1825	215	185639	5-386771	$0.1765121\cdot 179327 \cdot 5576378\cdot 9842985 \cdot 5031\cdot 1825215\cdot 185639 \cdot 586771\cdot 9832019\cdot 2951\cdot 1882385\cdot 191664 \cdot 5\cdot 217442\cdot 982134$	29 51	1882385	191664	5-217442	.9821234	6
17	67984	82 9641	5.567057	.9842471	493	2 1828	075	185940	5-378053	$1 \cdot 1767984 \cdot 1796 \cdot 28 \cdot 567057 \cdot 9842471 \cdot 49 \cdot 32 \cdot 1828075 \cdot 185940 \cdot 5 \cdot 378053 \cdot 9831487 \cdot 28 \cdot 52 \cdot 1885241 \cdot 191966 \cdot 5 \cdot 309245 \cdot 9820686 \cdot 32 \cdot 3$	28 52	1885241	191966	5-209245	9830686	00
17	70847	179928	5-557766	9841956	483	3 1830	935	186241	5.369363	$2 \cdot 1770847 \cdot 179928 \cdot 557766 \cdot 9841956 \cdot 48 \cdot 83 \cdot 1830935 \cdot 186241 \cdot 5 \cdot 369363 \cdot 9830955 \cdot 27 \cdot 53 \cdot 1888098 \cdot 192268 \cdot 5 \cdot 201073 \cdot 9820137 \cdot 1888098 \cdot 192268 \cdot 1922688 \cdot 192268 \cdot 192268$	27 53	1888098	.192268	5-201073	-9820137	-
17	73710	180228	5-548505	.9841441	473	4 1833	795	186542	5-360699	$3 \cdot 1773710 \cdot 180228 \cdot 5 \cdot 548505 \cdot 9841441 \cdot 47 \cdot 34 \cdot 1833795 \cdot 186542 \cdot 5 \cdot 360699 \cdot 9830422 \cdot 2654 \cdot 1890954 \cdot 192569 \cdot 5 \cdot 192926 \cdot 9819587 \cdot 1890958 \cdot 192926 \cdot 192928 \cdot 192926 \cdot 192926$	2654	1890954	-192569	5-192926	9819587	9
17	76573	180529	5-539274	9840924	463	5 1836	654	186843	5-352062	$14.1776573 \cdot 180529 \cdot 5539274 \cdot 9840924 \cdot 46.35 \cdot 1836654 \cdot 186843 \cdot 6\cdot352062 \cdot 982988 \cdot 25.55 \cdot 1893811 \cdot 192871 \cdot 5\cdot184803 \cdot 9819037 \cdot 189381 \cdot 18988 \cdot 189888 \cdot 18988 \cdot 1$	25 55	11893811	1192871	5-184803	-9819037	123
17	79435	180829	5-580072	-9840407	453	681.9	514	187144	5.343452	$15 \cdot 1779435 \cdot 180829 \cdot 5 \cdot 580072 \cdot 9840407 \cdot 45 \cdot 36 \cdot 1839514 \cdot 187144 \cdot 5 \cdot 343452 \cdot 9829353 \cdot 24 \cdot 56 \cdot 1896667 \cdot 193173 \cdot 5 \cdot 176705 \cdot 9818485 \cdot 1888888 \cdot 1888888 \cdot 1888888 \cdot 18888888 \cdot 1888888 \cdot 1888888 \cdot 1888888 \cdot 1888888 \cdot 188888 \cdot 18888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 18888 \cdot 188888 \cdot 18888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 18888 \cdot 188888 \cdot 18888 \cdot 1$	24 56	1896667	193173	5.176705	-9818485	4
17	85558	181129	5.520900	6886886	443	7 -1842	373	187446	5-334869	$6 \cdot 1782298 \cdot 181129 \cdot 5 \cdot 20900 \cdot 9839889 \cdot 44 \cdot 37 \cdot 1842373 \cdot 187446 \cdot 5 \cdot 334869 \cdot 9828818 \cdot 2367 \cdot 1899623 \cdot 193474 \cdot 5 \cdot 168631 \cdot 9817933 \cdot 18748 \cdot 1888818 \cdot 188888 \cdot 188888 \cdot 18888888 \cdot 188888 \cdot 1888888 \cdot 188888 \cdot 1888888 \cdot 1888888 \cdot 188888888$	23 57	.1899523	193474	5-168631	-9817933	00
17	85160	181430	5-511757	-9839370	433	8 -1845	232	187747	5-326313	$ \begin{array}{c} 17.1785160 \cdot 181430 \cdot 5.511757 \cdot 9839370 \cdot 43 \cdot 38 \cdot 1845232 \cdot 187747 \cdot 5.326313 \cdot 9828282 \cdot 22 \cdot 58 \cdot 1902379 \cdot 193776 \cdot 5.160581 \cdot 9817380 \cdot 10000000000000000000000000000000000$	22 58	.1902379	193776	5-160581	-9817380	24
17	88022	181730	5-502644	98388501	423	91.1848	1160	188048	5-317783	$8.1788022 \cdot 181730 \cdot 502644 \cdot 9838850 \cdot 4239 \cdot 184809 \cdot 1788048 \cdot 571783 \cdot 9827744 \cdot 2159 \cdot 1905234 \cdot 194078 \cdot 57152555 \cdot 9816826 \cdot 194078 \cdot 1940$	21 59	1905234	194078	5.152555	9816826	
27	190884	19 1790884 182031	5-493560	5-493560 -9838330 41	414	0.1850	949	188349	5-309279	$\frac{9 \cdot 1790884}{200 \cdot 1793746} \cdot 182331 \cdot 5 + 93560 \cdot 9838330 \cdot 41 \cdot 40 \cdot 1850949 \cdot 188349 \cdot 5 \cdot 309279 \cdot 9827206 \cdot 20 \cdot 60 \cdot 1908090 \cdot 194380 \cdot 5 \cdot 144554 \cdot 9816272 \cdot 20 \cdot 1793746 \cdot 182331 \cdot 5 + 84505 \cdot 9837808 \cdot 40$	20 60	1908090	194380	5-144554	-9816272	9
14	1		E	1	1	1	T		A	1	1	1			1	1.
0	Cosine.	Cotang.	Tang.	Sine.		Cosi	ne. I	Cosine. Cotang.	Tang.	Sine.	11	Cosine. Cotang.	Cotang.	Tang.	Sine.	_

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	Cosme.	9792818	9792228	9791638	9791047	9790455	9789862	9789268	9788674	6208846	9787483	9889846	9:86288	9785689	9785090,	9784490	9783889	9783287	9782684	97820801	9781476	Sine.	٩
	Cotang.	0.1908090 194380 5.144554 9816272 6021 1968018 200727 4.981881 9804433 38 11 32025024 206786 4.835901 9792818 19	$\cdot 1910945 \cdot 194682 \cdot 5 \cdot 136576 \cdot 9815716 \cdot 59122 \cdot 1970870 \cdot 201030 \cdot 4 \cdot 974381 \cdot 9803860 \cdot 38142 \cdot 2027873 \cdot 207090 \cdot 4 \cdot 828817 \cdot 979328 \cdot 18 \cdot $	$\cdot 1913801 \cdot 194984 \cdot 5 \cdot 128622 \cdot 9815160 \cdot 5823 \cdot 1973722 \cdot 201332 \cdot 4 \cdot 966903 \cdot 9803286 \cdot 3743 \cdot 2030721 \cdot 207393 \cdot 1821753 \cdot 9791638 \cdot 1973721 \cdot 2030721 \cdot 20307$	$3 \cdot 1916666 \cdot 195286 \cdot 1520692 \cdot 9814603 \cdot 5724 \cdot 1976573 \cdot 201635 \cdot 4 \cdot 950447 \cdot 9802712 \cdot 3644 \cdot 203369 \cdot 207696 \cdot 4 \cdot 814709 \cdot 9791047 \cdot 120666 \cdot 120669 \cdot 12066$	$\cdot 1919510 \left[\cdot 195588 \right. 5 \cdot 112786 \left[\cdot 9814045 \right] 5625 \cdot 1979425 \cdot 201938 \right. \left. 4 \cdot 952012 \cdot 9802136 \right] 3545 \left[\cdot 2036418 \cdot 2036418 \right] \cdot 2036418 \cdot 20364$	$\cdot 1922365 \cdot 195890 \cdot 5 \cdot 104902 \cdot 9813486 \cdot 5526 \cdot 1982276 \cdot 302240 \cdot 4 \cdot 944599 \cdot 9801560 \cdot 34 \cdot 46 \cdot 2039265 \cdot 208303 \cdot 4 \cdot 800680 \cdot 9789862 \cdot 1922365 \cdot 192266 \cdot 192266$	$\cdot 1925220 \cdot 196192 \cdot 5 \cdot 097042 \cdot 9812927 \cdot 5427 \cdot 1985127 \cdot 202543 \cdot 4 \cdot 937206 \cdot 9800985 \cdot 3347 \cdot 2042113 \cdot 208607 \cdot 4 \cdot 793695 \cdot 9789268 \cdot 1387206 \cdot 2080687 \cdot 2080687 \cdot 208607 \cdot 208607 \cdot 2080687 \cdot 2080688 \cdot 208068 \cdot$	$7 \cdot 1928074 \cdot 196494 \cdot 5 \cdot 089206 \cdot 9812366 \cdot 5328 \cdot 1987978 \cdot 202846 \cdot 4 \cdot 929835 \cdot 9800405 \cdot 3248 \cdot 2044961 \cdot 208910 \cdot 4 \cdot 786730 \cdot 9788674 \cdot 1988674 \cdot 1988676 \cdot 1988676 \cdot 1988676 \cdot 1988676 \cdot $	$8 \cdot 1930928 \cdot 196796 \cdot 5 \cdot 081392 \cdot 9811805 \cdot 5229 \cdot 1990829 \cdot 203149 \cdot 4 \cdot 922485 \cdot 9799827 \cdot 31149 \cdot 2047808 \cdot 209214 \cdot 4 \cdot 779783 \cdot 9788079 \cdot 2047808 \cdot$	$9 \cdot 933782 \cdot 197098 \cdot 5 \cdot 073602 \cdot 9811243 \cdot 5130 \cdot 1993679 \cdot 203452 \cdot 4 \cdot 915157 \cdot 9799247 \cdot 3050 \cdot 2050655 \cdot 209518 \cdot 4 \cdot 772856 \cdot 9787483 \cdot 2050655 \cdot 2050655 \cdot 209518 \cdot 4 \cdot 772856 \cdot 9787483 \cdot 2050655 \cdot 2050655 \cdot 2050655 \cdot 2050656 \cdot 20506656 \cdot 20506666 \cdot 2050666 \cdot 205066 \cdot 205066 \cdot 2050666 \cdot 205066 \cdot 205066 \cdot 2050666 \cdot 2050666 \cdot 2050666 \cdot 2050666 \cdot 2050666 \cdot 2050666 \cdot 205066 \cdot 205066 \cdot 2050666 \cdot 205066 \cdot 205066 \cdot 205066 \cdot 205066 \cdot 205066 \cdot 2050666 \cdot 205066 \cdot 2050666 \cdot 2050666 \cdot 2050666 \cdot 2050666 \cdot 2050666 \cdot 2050666$	$ (0.1936636 \cdot 197400 \mid 5.065835 \mid 9810680 \mid 50 \mid 31 \cdot 1996530 \mid 203755 \mid 4.907849 \mid 9798667 \mid 29 \mid 51 \cdot 2053502 \mid 20982 \mid 4.765949 \mid 9786886 \mid 2008886 \mid 200886 \mid 2008886 \mid 2008886 \mid 2008886 \mid 2008886 \mid 2008886 \mid 20$	(1) + 1939490 + 197703 + 5058090 + 9810116 + 49 + 32 + 1999380 + 204058 + 900562 + 9798086 + 28 + 52 + 2056349 + 210125 + 759060 + 9786288 + 20562 + 2056248 + 20562	$291942344 \cdot 1980055059999999999999999999999999999999$	$31945197 \cdot 198307 \mid 5.042670 \cdot 9808986 \mid 47 \mid 34 \cdot 2005080 \mid 2.04664 \mid 4.886049 \cdot 9796921 \mid 26 \mid 54 \cdot 2062042 \mid 210733 \mid 4.745340 \mid 9785090 \mid 210735 \mid 210$	$(4) \cdot 1948050 \cdot 198610 \cdot 5034993 \cdot 9808420 \cdot 4635 \cdot 2007930 \cdot 204967 \cdot 4 \cdot 878824 \cdot 9796337 \cdot 2555 \cdot 2064888 \cdot 211036 \cdot 4 \cdot 738508 \cdot 9784490 \cdot 10867 \cdot 10867$	$ \begin{array}{c} 5 \cdot 1950903 \cdot 198912 \\ \hline 5 \cdot 027339 \\ \hline \end{array} \cdot 2077853 + 5 \\ \hline 36 \cdot 2010779 \\ \hline \end{array} \cdot 205270 \\ \hline 4 \cdot 871620 \\ \hline \end{aligned} \cdot 9795752 \\ \hline 279572 \\ \hline \end{aligned} \cdot 24 \\ \hline \end{aligned} \cdot 216734 \\ \hline \end{aligned} \cdot 211340 \\ \hline \end{aligned} \cdot 21340 \\ \hline \end{aligned} \cdot 21734 \\ \hline \end{aligned}$	$16.1953756 \cdot 199214 \cdot 5019707 \cdot 9807285 \cdot 4437 \cdot 2013629 \cdot 205573 \cdot 4\cdot864435 \cdot 9795167 \cdot 2357 \cdot 2070580 \cdot 211644 \cdot 724901 \cdot 9783287 \cdot 100000000000000000000000000000000000$	$(7.1956609 \cdot 199517 \cdot 5 \cdot 012098 \cdot 9806716 \cdot 4338 \cdot 2016478 \cdot 205876 \cdot 4 \cdot 857271 \cdot 9794581 \cdot 2258 \cdot 2073426 \cdot 211948 \cdot 4 \cdot 718125 \cdot 9782884 \cdot 218125 \cdot 21$	$8 \cdot 1959461 \cdot 199819 \cdot 5 \cdot 004511 \cdot 9806147 \cdot 42 \cdot 391 \cdot 2019327 \cdot 206180 \cdot 4 \cdot 8 \cdot 30128 \cdot 9793994 \cdot 21 \cdot 591 \cdot 207627 \cdot 212252 \cdot 4 \cdot 711368 \cdot 9782080 \cdot 201627 \cdot $	$ \begin{array}{c} (9 \cdot 1962314 \cdot 200122 \cdot 4 \cdot 986945 \cdot 9805576 \cdot 4140 \cdot 2022176 \cdot 206483 \cdot 843004 \cdot 9793406 \cdot 2060 \cdot 2079117 \cdot 212556 \cdot 4 \cdot 704630 \cdot 9781476 \cdot 2065166 \cdot 206424 \cdot 4 \cdot 989402 \cdot 989402 \cdot 9605005 \cdot 40 \cdot 206606 \cdot 20660$	Tang.	
	Tang.	-206786	-207090	-207393	969402	208000	-208303	109802	.208910	-209214	812602	209821	210125	210429	210733	-211036	-211340	211644	211948	212259	-212556	Cotang.	
.9.7.	Sine.	2025024	2027873	2030721	2033569	2036418	2039265	2042113	2044961	2047808	2050655	2053502	2056349	2059195	2062042	2064888	2067734	2070580	2073426	2076272	2079117	/ Cosine. Cotrng.	
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		38	38	3 37	36	35	34	33	32	31	30	29	28	27	26	25	24	233	C.5	21	20	~.	1
	Cosine.	980443	9803860	9803286	9802715	9802136	9801560	860086	980040	9799827	9799247	9798667	9808646-	9797504	9796921	9796537	9795752	9795167	9794581	9793994	9793406	Sine.	۶
	Tang. Cotang.	4.981881	4.974381	4.966903	4-959447	4.952012	4.944599	4.937206	4.929835	4.922485	4-915157	4.907849	1-900265	4-893295	1.886049	1-878824	1.871620	1.864435	1.857271	1.850128	1-843004	Tang.	
	Tang.	-200727	-201030	201332	-201635	-201938	202240	202543	202846	203149	203452	203755	204058	204361	204664	204967	205270	205573	205876	206180	206483	Cotang.	
	Sine.	1968018	1970870	1973722	1976573	1979425	1982276	1985127	1987978	1990829	1993679	1996530	1999380	2002230	2005080	2007930	8210102	2013629	2016478	17286102	2022176	Cosine. Cotang.	
	7	21	22	23	24	52	56	27	.88	- 62	30	31	32	33	34	35	98	37	38	39	0	1	ŀ
	,	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	40	6	Ş
	Cosine.	-9816272	9815716	9815160	9814603	9814045	9813486	9812927	9812366	981186	9811243	0890186	9810116	9809552	9868086	9808420	9807853	9807285	9119086	9806147	9805576 9805005	Sine.	,
-	Cotang.	5-144554	5-136576	5-128622	5-120692	5-112785	5.104902	5.097042	5.089206	5.081392	5.073602	5.065835	5.058090	5-050369	5-042670	5-034993	5-027339	5-019707	5-012098	5-004511	19 ·1962314 ·200122 4·996945 ·9805576 41 20 ·1965166 ·200424 4·989402 ·9805005 40	Tang.	
	Tang.	194380	194682	194984	195286	195588	195890	196192	196494	962961	860761	197400	197703	198005	198307	198610	198912	199214	1199517	618661	200122	Cotang.	
11 Deg.	Sine.	1908090	1910945	1913801	1916656	1919510	1922365	1925220	1928074	1930928	1933782	1936636	1939490	1942344	1945197	1948050	1950903	1953756	1956609	1959461	1962314	Cosine.	
	-	0	-	65	8	+H	20	9	7	00	6	10	11	23	13	14	15	16	17	8	19	الم	

	- 1	19	8	17	16	15	14	13	55	11	0.1	6	00	7	9	ro.	4	3	C.5	I	0			1
	Cosine.	9755985	9755345	9754706	9754065	9753423	9752781	9752138	9751494	9750849	9750203	9749556	9748909	9748261	9747612	9746962	9746311	9745660	9745008	9744355	9743701	ĺ	Sine.	2
	Cotang.	2079117 -212556 4.704630 -9781476 6021 -2138329 -218949 4-567261 -9768593 3941 -2195624 -225054 4-443376 -9755985 19	$\textbf{2081962} \cdot 212860 \cdot 1 \cdot 697910 \cdot 9780871 \cdot 5982 \cdot 2141671 \cdot 319254 \cdot 560911 \cdot 9767970 \cdot 3842 \cdot 2198462 \cdot 225359 \cdot 4 \cdot 437350 \cdot 9755345 \cdot 4 \cdot 108816 \cdot 10$	$2084807 \cdot 213164 \cdot 4-691208 \cdot 9780265 \cdot 5823 \cdot 2144512 \cdot 219559 \cdot 4 \cdot 554577 \cdot 9767347 \cdot 8743 \cdot 2201300 \cdot 225665 \cdot 4 \cdot 431339 \cdot 9754706 \cdot 8767347 \cdot 876747 \cdot 87674$	$2087652 \cdot 213468 \cdot 4 \cdot 684524 \cdot 9779658 \cdot 5724 \cdot 2147353 \cdot 219864 \cdot 4 \cdot 548260 \cdot 9766723 \cdot 3644 \cdot 2204137 \cdot 22597 \cdot 4 \cdot 425343 \cdot 9764065 \cdot 166723 \cdot 213468 \cdot 213468$	$ \begin{array}{c} -2090497 \cdot 213773 \\ 4 \cdot 677859 \cdot 9779050 \\ 8 \cdot 677859 \cdot 9779050 \\ 8 \cdot 675978 \\ 8 \cdot 67597$	$2093341 \cdot 214077 \cdot 4671212 \cdot 9778441 \cdot 5526 \cdot 2153035 \cdot 220474 \cdot 4535677 \cdot 9765472 \cdot 3446 \cdot 2209811 \cdot 226582 \cdot 4413399 \cdot 9752781$	$2096186 \cdot 214381 \cdot 4 \cdot 664583 \cdot 9777832 \cdot 5427 \cdot 2155876 \cdot 220779 \cdot 4 \cdot 529410 \cdot 9764845 \cdot 3347 \cdot 2212648 \cdot 226888 \cdot 4 \cdot 407450 \cdot 9752138 \cdot 107678 \cdot 10767$	$2099030 \cdot 214685 \cdot 4 \cdot 657972 \cdot 9777222 \cdot 6328 \cdot 2158716 \cdot 221084 \cdot 4 \cdot 523160 \cdot 9764217 \cdot 3248 \cdot 2216485 \cdot 227794 \cdot 4 \cdot 401516 \cdot 9751494$	$8 \cdot 2101874 \cdot 214990 \cdot 4 \cdot 651378 \cdot 9776611 \cdot 5229 \cdot 2161556 \cdot 221389 \cdot 4 \cdot 516926 \cdot 9763589 \cdot 3149 \cdot 2218321 \cdot 227500 \cdot 4 \cdot 395597 \cdot 9760849 \cdot 395997 \cdot 3161556 \cdot 395997 \cdot 316156 \cdot 39597 \cdot 316156 \cdot 39597 \cdot 316156 \cdot 39597 \cdot 316156 \cdot 39597 \cdot 316156 \cdot 31616 \cdot 31$	$\textbf{9.2104718} \cdot \textbf{2.15294} + \textbf{644803} \cdot \textbf{9775999} \cdot \textbf{5130} \cdot \textbf{2164396} \cdot \textbf{221694} + \textbf{510708} \cdot \textbf{9762960} \cdot \textbf{3050} \cdot \textbf{2221158} \cdot \textbf{227806} + \textbf{389694} \cdot \textbf{9750203} \cdot \textbf{9762960} \cdot \textbf{3050} \cdot \textbf{3221158} \cdot \textbf{327806} \cdot \textbf{3227806} \cdot \textbf{3227806} \cdot \textbf{3227158} \cdot \textbf{3227806} \cdot 3$	$10.2107661 \cdot 215598 \cdot 4 \cdot 638245 \cdot 9775386 \cdot 5031 \cdot 2167236 \cdot 221999 \cdot 4 \cdot 504507 \cdot 9762330 \cdot 2951 \cdot 2223994 \cdot 228112 \cdot 4 \cdot 383805 \cdot 9749556 \cdot 2010 \cdot 2010$	$1 \cdot 2110405 \cdot 215903 \cdot 4 \cdot 631705 \cdot 9771773 \cdot 49 \cdot 32 \cdot 2170076 \cdot 222305 \cdot 4 \cdot 493322 \cdot 9761699 \cdot 28 \cdot 52 \cdot 222630 \cdot 228418 \cdot 4 \cdot 377931 \cdot 9748909 \cdot 48 \cdot 4$	$12\cdot 2113248 \cdot 216207 \cdot 4 \cdot 625183 \cdot 9774159 \cdot 48 \cdot 33 \cdot 21729 \cdot 15 \cdot 222610 \cdot 4 \cdot 492153 \cdot 9761067 \cdot 2753 \cdot 2229666 \cdot 228724 \cdot 4 \cdot 372073 \cdot 9748261 \cdot 278261 \cdot 2782$	$13 \cdot 2116091 \cdot 216512 \cdot 4 \cdot 618678 \cdot 9773544 \cdot 47734 \cdot 2175754 \cdot 322915 \cdot 4 \cdot 486000 \cdot 9760435 \cdot 2654 \cdot 3232501 \cdot 229030 \cdot 4 \cdot 366229 \cdot 9747612 \cdot 2232501 \cdot 2232501 \cdot 2232501 \cdot 2232501 \cdot 223201 \cdot 2232501 \cdot$	$14.2118934.216816 \\ 4.612190 \\ 9772928 \\ 46 \\ 35.2178593 \\ -2178593 \\ -2178593 \\ -2178593 \\ -2178593 \\ -2178593 \\ -2178593 \\ -2178593 \\ -2178593 \\ -2178593 \\ -217859 \\ -21785$	$16.2121777/217121 \\ 14.605720 \\ 9772311 \\ 45.60 \\ 9772311 \\ 45.96 \\ 978142 \\ 978142 \\ 978168 \\ 978168 \\ 9759168 \\ $	$16.2124619 \cdot 217425 \cdot 4.599268 \cdot 9771693 \cdot 44.37 \cdot 2184271 \cdot 225831 \cdot 4.467637 \cdot 9758533 \cdot 2357 \cdot 2241007 \cdot 229949 \cdot 4.348786 \cdot 9745660 \cdot 2124619 \cdot 217425 \cdot 217425$	47.2127462.217730 $4.592832.9771075$ $4338.2187110.224137$ $4.461548.9757897$ 2258.12878 2243842.230255 4.343001 9745008	$18.2130304 \cdot 218035 \cdot 4 \cdot 586414 \cdot 9770456 \cdot 42939 \cdot 2189948 \cdot 224442 \cdot 4 \cdot 455475 \cdot 9 \cdot 757260 \cdot 2159 \cdot 2246676 \cdot 23056 \cdot 4 \cdot 33723 \cdot 9744355 \cdot 9757260 \cdot 2159 \cdot 2246676 \cdot 23056 \cdot 4 \cdot 33723 \cdot 1 \cdot 9744355 \cdot 236767 \cdot 23$	$(9.2133146) \cdot 218340 \cdot 4.580012 \cdot 9769836 \cdot 4140 \cdot 2192786 \cdot 224748 \cdot 4.449418 \cdot 9756623 \cdot 2060 \cdot 2249511 \cdot 230868 \cdot 4.831475 \cdot 9743701 \cdot 2249618 \cdot 224961$		Tang.	
	Tang.	225054	-225359	-225665	.225971	-226276	226582	226888	-227194	-227500	-227806	228112	228418	-228724	-229030	-229336	229642	229949	-230255	230561	898082		Cotang.	
1% Deg.	Sine.	2195624	2198462	2201300	2204137	2206974	1186022	2212648	2215485	2218321	821128	2223994	2226830	2229666	2232501	2235337	2238172	2241007	2243842	2246676	2249511		Cosine. Cotang.	
3	,	341	3 42	43	544	945	146	347	84	49	.000	.119	352	53	. 19	99	99	357	58	59	. 09		~	
	-	133	70 3	17 3	23 3	8 3	2 3	53	7	39 3	30 3	30 25	19 28	27 2	35 2	20	8 2	33 2	7 25	20 2	23 26		×	1
	Cosine.	97685	-976797	976734	976672	976609	976547	976484	976421	976358	976296	976233	976169	976106	976043	975980	975916	975853	975789	975726	975662		Sine.	۶
	Cotang.	4.567261	4.560911	4.554577	4.548260	4.541960	4-535677	4.529410	4.523160	4-516926	4.510708	4.504507	4.498322	4.492153	4-486000	1-479863	4-473742	4-467637	1.461548	1-455475	4-449418		Tang.	
	Tang.	218949	219254	219559	219864	220169	220474	9220779	221084	221389	221694	221999	222305	222610	222915	223221	223526	223831	224137	224442	224748		Cotang.	
,	Sine.	2138829	2141671	2144512	2147353	2150194	2153035	2155876	2158716	2161556	2164396	2167236	9200212	2172915	2175754	2178593	2181432	2184271	2187110	2189948	3192786		/ Cosine. Cotang.	
2	,	18	65	53	24	25	98	27	28	58	30	31	35	33	34	35	36	37 .	38	39	40		-	
	-	9 60	1 59	5 58	3 57	99 (55	2 54	2 53	52	51	350	3 49	9.48	147	3 46	45	3 44	5 43	3 42	341	2 40		
	Cosine.	978147	978087	978026	977965	977905	977844	977783	9777722	199776	9775999	977538	377177	977415	977354	9772928	977231	977169	977107	9770456	9769836	976921	Sine.	۶
	Cotang.	1-704630	016269-1	1.691208	1-684524	698779-1	1.671212	1-664583	1-657972	1-651378	1-644803	1-638245	1-631705	1.625183	849819-1	1-612190	1.605720	1.599268	1-592832	1.586414	1.580012	1.573628	Tang.	
	Tang.	212556	212860	213164	213468	213773	214077	214381	214685	214990	215294	215598	215903	216207	216512	216816	217121	217425	217730	218035	218340	218644	Cotang.	
0	Sine.	2079117	2081962	2084807	2087652	2090497	2093341	2096186	2099030	2101874	2104718	2107561	2110405	2113248	211609115	2118934	2121777	2124619	2127462	2130304	2133146	20 -2135988 -218644 4-573628 -9769215 40	Cosine, Cotang.	
	-	0	H	Cit	3	4	9	9	7	00	6	101	=	12	13	14	10	91	17	90	6	02		

13 Deg.

13 Deg.

13 Deg.

5823 2314649 237926 4 202983 9 28432 37 43 2371207 244081 4 096985 9714802 3644 2374033 244390 4.091817 9714112 46 -2379684 -245006 4.081519 -9712729 9725056 32 48 -2385335 -245623 4.071270 -9711343 49 -2388159 -245932 4-066164 9710649 30 2334454 240078 4 165299 9723699 30 50 2390984 246240 4 061070 9709953 27 2325967 239156 4 181371 9725733 3347 2382510 345315 4 076389 9712036 $4.325734 \cdot 9743046 \mid 59 \mid 22 \cdot 2311819 \cdot 237618 \mid 4.208419 \cdot 9729105 \mid 38 \mid 42 \cdot 2368381 \mid .243773 \mid 4.102164 \cdot 9715491 \mid .243773 \mid .24$ $3286341[324854[4.257950] \cdot 9735124[47]34[-2345766] \cdot 241309[4.144051] \cdot 9720976[26]34[-2402380] \cdot 247475[4.040812] \cdot 9707165[-26]34[-247876] \cdot 247475[-26]34[-26]$ 3545 -2376859 -244698 4-086662 -9713421 -2337282 -240386 4-159968 -9723020 2951 -2393808 -246549 4-055987 -9709258 $\cdot 2280677 \cdot 234241 \cdot 4 \cdot 269107 \cdot 9736453 \cdot 4938 \cdot 2340110 \cdot 240694 \cdot 4 \cdot 154650 \cdot 9722339 \cdot 2852 \cdot 239633 \cdot 246857 \cdot 4 \cdot 050917 \cdot 9708561 \cdot 240867 \cdot 2408$ $\cdot 2283509 \cdot 234547 \cdot 4 \cdot 263521 \cdot 9735789 \cdot 4833 \cdot 2342938 \cdot 241001 \cdot 4 \cdot 149344 \cdot 9721658 \cdot 2753 \cdot 2399457 \cdot 247166 \cdot 4 \cdot 045859 \cdot 9707863 \cdot 2283509 \cdot 22$ 9720294 25 55 -2405104 -247783 4-035777 -9706466 Cosine. Cotang. $4 \cdot 331475 \cdot 9748701 \cdot 6021 \cdot 2308989 \cdot 237311 \cdot 4213869 \cdot 9729777 \cdot 3941 \cdot 2365555 \cdot 243465 \cdot 4 \cdot 107356 \cdot 1$ Tang. Sine. -9726409 34 $\cdot 2272179 \cdot 233320 \cdot 4 \cdot 285947 \cdot 9738439 \cdot 5229 \cdot 2331625 \cdot 239771 \cdot 4 \cdot 170644 \cdot 9724378 \cdot 3119644 \cdot 110644 \cdot 110644$ 5724 2317479 238233 4.197560 9727759 4-308597 -9741077 5625 -2320309 -238541 4-192151 -9727084 Cosine -2269346, 233014 4.291588 -9739100 5328 -2328796 -239463 4.176001 -2263680 -232400 4-302913 -9740419 5526 -2323138 -238848 4-186754 -2289172 -235161 4-252392 -9734458 4635 -2348594 -241617 4-138771 Cotang. Tang. Sine. -2277844 -233934 4-274706 -9737116 50 2275012 -233627 4-280319 -9737778 51 4.320007 9742390 -2266513 -232707 4-297244 -9739760 -2258013 -231787 4-314295 -9741734 Cosine. Cotang. Tang. -2249511 -230868 -2252345 -231174 -2260846 -232094 -2255179 -231481 Sine. 6 52 60

Deg. 76.

 $18 \cdot 2300497 \cdot 236390 \cdot 4 \cdot 230297 \cdot 9731789 \cdot 42 \cdot 39 \cdot 2359902 \cdot 242849 \cdot 4 \cdot 17778 \cdot 9717554 \cdot 21 \cdot 59 \cdot 2416396 \cdot 249019 \cdot 4 \cdot 015757 \cdot 9703660 \cdot 2416396 \cdot 2416$

 $19 \cdot 2303328 \cdot 236697 \cdot 1 \cdot 224808 \cdot 9731119 \cdot 41 \cdot 140 \cdot 2362729 \cdot 243157 \cdot 4 \cdot 112561 \cdot 9716867 \cdot 20 \cdot 60 \cdot 2419219 \cdot 249328 \cdot 4 \cdot 010780 \cdot 100780 \cdot 100$

 $\cdot 2297666 \cdot 236082 \cdot 4.235800 \cdot 973.4457 \cdot 42388 \cdot 2357075 \cdot 242541 \cdot 4.123007 \cdot 9718240 \cdot 2257668 \cdot 2413574 \cdot 248710 \cdot 4.020744 \cdot 9704363 \cdot 2413574 \cdot 2413574 \cdot 248710 \cdot 2413574 \cdot 2413576 \cdot 2413577 \cdot 241357 \cdot 24137 \cdot 241357 \cdot 241357 \cdot 241357 \cdot 241357 \cdot 24137 \cdot 2$

 $15^{\circ}2292004^{\circ}235468^{\circ}14^{\circ}246848^{\circ}9733792^{\circ}45^{\circ}36^{\circ}2351421^{\circ}241925^{\circ}4^{\circ}133504^{\circ}9719610^{\circ}24^{\circ}56^{\circ}2407927^{\circ}248092^{\circ}4^{\circ}030755^{\circ}6705768^{\circ}67057^{\circ}687^{\circ}6$

Cotang.

Cosine.

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Sine.

Tang.

Cotang.

Cosine.

Sine.

Tang.

Cotang.

Cosine.

Tang.

Deg. 76. Sine.

NATURAL SINES AND TANGENTS TO A RADIUS 1.

4 Deg.			- 0		14	14 Deg.				14	14 Deg.				1
Sine. Tang. Cotang. Cosine.	Cotang.					Sine.	Tang.	Cotang.	Cosine.	,1,	Sine.	Tang.	Cotang.	Cosine.	
$\textbf{24.19219} \cdot \textbf{249328} \cdot \textbf{4.010780} \cdot \textbf{9702957} \cdot \textbf{60} \\ \textbf{20.1} \cdot \textbf{2478445} \cdot \textbf{255226} \cdot \textbf{3.908901} \cdot \textbf{9687998} \cdot \textbf{3941} \cdot \textbf{2534766} \cdot \textbf{262034} \cdot \textbf{3.816295} \cdot \textbf{9673415} \cdot \textbf{19} \\ \textbf{20.19219} \cdot \textbf{249328} \cdot \textbf{4.010780} \cdot \textbf{9702957} \cdot \textbf{9702957} \cdot \textbf{970295} \cdot \textbf{970295}$	-249328 4.010780 9702957 60 21	4.010780 9702957 6021	9702957 60 21	6021		2478445	255826	3-908901	9687998	3941	2534766	-262034	3-816295	-9673415	-
2422041 249637 $4-005816$ 9702253 5922 2481263 256136 3.904171 9687277 3842 2537579 262345 3.811773 9672678 18	·249637 4-005816 -9702253 5922 -2	4-005816 -9702253 5922 -2	-9702253 59 22 -2	59 22 .2	Ċ	481263	256136	3.904171	9687277	38 42	2537579	262345	3.811773	9672678	=
2424863 249946 4.000863 9701548 5823 2484081 256446 3.899451 9686555 $37[43]$ 2540393 262656 3.807260 9071939 1	249946 4.000863 9701548 58 23 2	4.000863 9701548 58 23 -2	-9701548 58 23 -2	58 23 -2	Č.	484081	-256446	3.899451	.9686555	3743	2540393	262656	3.807260	9671939	-
2427685 250255 $3\cdot995922$ 9700842 57 248689 97675 9775 9685832 96 44 254 2643 967 977	-250255 3-995922 -9700842 57 24 -24	3.995922 -9700842 57 24 -24	9700842 57 24 -24	57 24 .24	3	668981	-256756	3-894742	9685832	3644	2543206	-262967	3.802758	9671200	$\tilde{}$
2430507 250564 3 930992 9700135 5625 2489716 257066 3 890044 9685108 35 45 2546019 263278 3 798266 9670459 15	·250564 3·990992 ·9700135 56 25 ·24	3-990992 -9700135 56 25 -24	-9700135 56 25 -24	56 25 -24	3	917684	-257066	3.890044	8019896	3545	2546019	-263278	3.798266	-9670459	=
2433329 260873 $3\cdot986073$ 9699428 55 26 2492533 257376 $3\cdot865357$ 9684383 34 46 2548832 263589 $3\cdot793783$ 9669718 1	·250873 3·986073 ·9699428 55 26 ·24	3-986073 -9699428 55 26 -24	9699428 55 26 -24	55 26 -24	ėś	92533	-257376	3-885357	9684383	34 46	2548832	.263589	3-793783	9669718	7
$2436150 \cdot 251182 \cdot 3\cdot 981166 \cdot 9698720 \cdot 5427 \cdot 2495350 \cdot 257686 \cdot 3\cdot 880680 \cdot 9683658 \cdot 3347 \cdot 2551645 \cdot 263900 \cdot 3789310 \cdot 9668977 \cdot 1357686 \cdot 3847 \cdot 3551645 \cdot 363900 \cdot 3789310 \cdot 9668977 \cdot 1357686 \cdot 3847 \cdot 3551645 \cdot 363900 \cdot 3789310 \cdot 9668977 \cdot 1357689 \cdot 3789310 \cdot 378910 \cdot 378910 \cdot 378910 \cdot 378910 \cdot 378910 \cdot 37$	251182 3-981166 -9698720 5427 -24	3.981166 .9698720 5427 .24	9698720 54 27 -24	54 27 .24	.24	95350	-257686	3.880680	9683658	3347	2551645	-263900	3.789310	77689996	=
2438971 251491 3-976271 9698011 5328 2498167 257997 3-876014 9682931 3248 2554458 264211 3-784848 3668234 12	251491 3-976271 -9698011 5328 -24	3-976271 -9698011 5328 -24	9698011 53 28 -24	53 28 -24	22	198167	-257097	3.876014	9682931	3248	2554458	264211	3.784848	9668234	7.
$\textbf{-2441792} \cdot \textbf{251801} \cdot \textbf{3:971386} \cdot \textbf{9697301} \cdot \textbf{52} \textbf{29} \cdot \textbf{250984} \cdot \textbf{258307} \cdot \textbf{3:871358} \cdot \textbf{9682204} \cdot \textbf{3149} \cdot \textbf{2557270} \cdot \textbf{264522} \cdot \textbf{3:780395} \cdot \textbf{9667490}$	251801 3-971386 -9697301 52 29 -25	3-971386 -9697301 52 29 -25	9697301 52 29 -25	52 29 25	.25	00984	-258307	3.871358	.9682204	3149	2557270	264522	3.780395	-9667490	-
$9 \cdot 2444613 \cdot 252110 \cdot 3 \cdot 966513 \cdot 9665691 \cdot 51 \cdot 30 \cdot 2503800 \cdot 258617 \cdot 3 \cdot 86713 \cdot 9681476 \cdot 30 \cdot 50 \cdot 2560082 \cdot 264833 \cdot 3 \cdot 775951 \cdot 9666746$	252110 3-966513 -9696591 51 30 -25	3-966513 -9696591 51 30 -25	-9696591 51 30 -25	51 30 -25	-25	03800	-258617	3-866713	9681476	30 50	2560082	264833	3-775951	9666746	=
$0.2447433 \cdot 252420 \cdot 3 \cdot 961651 \cdot 9695879 \cdot 50 \cdot 31 \cdot 2506616 \cdot 258928 \cdot 862078 \cdot 9680748 \cdot 2951 \cdot 2562894 \cdot 265145 \cdot 3 \cdot 771518 \cdot 9666001$	252420 3-961651 -9695879 50 31 -25	3-961651 -9695879 50 31 -25	9695879 50 31 -25	50 31 -25	55	91990	-258928	8.862078	-9680748	2951	2562894	265145	3-771518	1009996	-
$111 \cdot 2450254 \cdot 252729 \cdot 3956801 \cdot 9695167 \cdot 4932 \cdot 2509432 \cdot 259238 \cdot 3857453 \cdot 9680018 \cdot 2852 \cdot 2565705 \cdot 265456 \cdot 3767094 \cdot 9665255 \cdot 3857675 \cdot 385767 $	252729 3-956801 -9695167 49 32 -25	3-956801 -9695167 49 32 -2,5	-9695167 49 32 -25	49 32 25	.25	09432	.259238	3.857453	8100896	28 52	2565705	265456	3.767094	9865255	~
$12 \cdot 2453074 \cdot 253038 \cdot 3 \cdot 951961 \cdot 9694453 \cdot 4883 \cdot 2512248 \cdot 259548 \cdot 852839 \cdot 9679288 \cdot 2753 \cdot 2568517 \cdot 265768 \cdot 3 \cdot 762680 \cdot 9664508 \cdot 2762680 \cdot 276$	·253038 3·951961 ·9694453 48 33 ·25	3-951961 -9694453 48 33 -25	-9694453 48 33 -25	48 33 -25	.25	12248	.259548	3.852839	8856296	27 53	2568517	891592	3.762680	-9664508	•
$13.2455894.253348 \mid 3.947133 \mid .9693740 \mid 47 \mid 34 \mid .2515063 \mid .259859 \mid 3.848235 \mid .9678657 \mid .26154 \mid .2571328 \mid .266079 \mid 3.758276 \mid .9663761 \mid .25761328 \mid .26164 \mid .2571328 \mid .261677 \mid .2616$	253348 3.947133 .9693740 47 34 .25	3-947133 -9693740 47 34 -25	9693740 47 34 .25	47 34 .25	35	15063	.259859	8.848235	.9678557	26 54	2571328	920992	3.758276	-9663761	-
$14 \cdot 2458713 \cdot 253658 \cdot 3 \cdot 942315 \cdot 9693025 \cdot 46 \cdot 35 \cdot 2517879 \cdot 260169 \cdot 3 \cdot 843642 \cdot 9677825 \cdot 25555 \cdot 2574139 \cdot 266390 \cdot 3 \cdot 753881 \cdot 266390 \cdot 3 \cdot 263891 \cdot 266390 \cdot 266390$	·253658 3·942315 ·9693025 46 35 ·25	3-942315 -9693025 4635 -25	9693025 4635 -25	4635 -25	Ç,	17879	-260169	3.843642	-9677825	25 55	2574139	-266390	3-753881	-9663012	4.5
15/2461533/253967/3937509/9692309/45/36/2520694/260480/3839059/9677092/24/56/2576950/266702/3749496/9662263	-253967 3-937509 -9692309 45 36 -25	3-937509 -9692309 45 36 -25	-9692309 45 36 -25	45 36 -25	çş	20694	260480	3.839059	-9677092	24 56	2576950	202995	3.749496	-9662263	4
$16 \cdot 2464352 \cdot 254277 \cdot 3 \cdot 932714 \cdot 9691593 \cdot 4437 \cdot 2523508 \cdot 260791 \cdot 3 \cdot 834486 \cdot 9676358 \cdot 2557 \cdot 2579760 \cdot 267014 \cdot 3 \cdot 745120 \cdot 9661513 \cdot 264352 \cdot 264352 \cdot 2646763 \cdot 2646764 \cdot 2$	-254277 3-932714 -9691593 44 37 -25	3-932714 -9691593 44 37 -25	9691593 44 37 -25	44 37 -25	.25	23508	162092	3.834486	9676358	25,57	2579760	267014	3.745120	-9661513	0.0
$17.2467171.254587 \\ 3.927929 \\ 9690876 \\ 4388.2526323 \\ 261101 \\ 3.829923 \\ 96607624 \\ 22624 \\ 22628 \\ 22788 \\ 20780 \\ 267326 \\ 3.746754 \\ 3.867952 \\ 3.74675 \\ 3.867952 \\ 3.74675 \\ 3.867952 \\ 3.74675 \\ 3.867952 \\ 3.74675 \\ 3.867952 \\ 3.74675 \\ 3.86795 \\ $	-254587 3-927929 -9690875 43 38 -25	3-927929 -9690875 43 38 -25	9690875 4338 -25	43 38 .25	.25	26323	261101	3.829923	9675624	22 58	.2582570	267325	3-740754	-9660762	**
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	Cosme.	962770	962691	962613	962534	-962455	962376	962297	.962218	962138	-9620599	961980	-961900	-9618210	961741	961661	9615818	9615019	-9614219	-9613418	-961261		0:-
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\cdot 530005 \cdot 9621387 \cdot 1 \cdot 2 \cdot 2$	$\cdot 2613469 \cdot 270757 \cdot 3 \cdot 693346 \cdot 9652449 \cdot 51 \cdot 30 \cdot 2672384 \cdot 277324 \cdot 3 \cdot 605883 \cdot 9636305 \cdot 30 \cdot 50 \cdot 2728400 \cdot 283599 \cdot 3 \cdot 526093 \cdot 9620594 \cdot 3 \cdot 526093 $	$10\cdot 2616277\cdot 271069 \\ 3\cdot 689092\cdot 9651689 \\ 50\begin{vmatrix} 31 \cdot 2675187 \cdot 277637 \\ 3\cdot 601814 \cdot 9635527 \\ 3\cdot 601814 \cdot 9635527 \\ 29\begin{vmatrix} 51 \cdot 2731198 \cdot 283914 \\ 3\cdot 522190 \\ 9619800 \\ 3\cdot 601814 \cdot 9635527 \\ 3\cdot 601814 \cdot 963527 \\ 3\cdot 601814 \cdot 96327 \\ 3\cdot 601814 \cdot 963527 \\ 3\cdot 6$	$2619085 \cdot 271381 \cdot 3684847 \cdot 9650927 \cdot 49 \cdot 32 \cdot 2677989 \cdot 277951 \cdot 3597764 \cdot 9634748 \cdot 2852297 \cdot 2733997 \cdot 284228 \cdot 3518294 \cdot 9619005 \cdot 273398 \cdot 2733997 \cdot 284228 \cdot 371981 \cdot 28428 \cdot 273398 \cdot 2733997 \cdot 284228 \cdot 37198 \cdot 273398 \cdot 273398 \cdot 273399 \cdot 273399 \cdot 273398 \cdot 273398 \cdot 273398 \cdot 273398 \cdot 27339 \cdot 27$	$12\cdot 2621892\cdot 271694 \cdot 3\cdot 680611 \cdot 9650165 \cdot 48 \cdot 33\cdot 2680792 \cdot 278264 \cdot 3\cdot 593702 \cdot 9633969 \cdot 2753 \cdot 2736794 \cdot 284543 \cdot 3\cdot 514407 \cdot 9618216 \cdot 316767 \cdot 316$	$13, 2624699, 272006 \\ 3.676384, 9649402 \\ 47 \\ 34, 2683594, 278578 \\ 3.589659, 9633189, 2654, 2739592, 284857 \\ 3.589659, 9617413 \\ 3.589659, 9633189, 2654, 2739592, 284857 \\ 3.58078, 3.58578, 3.58578, 3.58578, 3.58578, 3.58578, 3.58578, 3.58578, 3.589659, 3.58578, 3.585$	$\cdot 2627506 \cdot 272318 \cdot 3 \cdot 672166 \cdot 9648638 \cdot 4635 \cdot 2686396 \cdot 278891 \cdot 3 \cdot 585624 \cdot 9632408 \cdot 2555 \cdot 2742390 \cdot 285172 \cdot 3 \cdot 506655 \cdot 9616616 \cdot 272318 \cdot 2742399 \cdot 285172 \cdot 3 \cdot 286655 \cdot 9616616 \cdot 286767 \cdot 286767$	$[5] \times 630312 \cdot 272631 \mid 3 \cdot 667957 \mid 9647873 \mid 45 \mid 36 \cdot 2689199 \mid 279205 \mid 3 \cdot 581597 \mid 9631626 \mid 24 \mid 56 \mid 2456 \mid 2745187 \mid 285486 \mid 3 \cdot 502791 \mid 9615818 \mid 285486 \mid 28548$	$\cdot 2633118 \cdot 272943 \cdot 3.663757 \cdot 9647108 \cdot 4437 \cdot 2692000 \cdot 279518 \cdot 3.577579 \cdot 9630843 \cdot 2357 \cdot 2747984 \cdot 285801 \cdot 3.498935 \cdot 9615019 \cdot 3.2633118 \cdot 2.26361 \cdot 2.2636$	$\cdot 2635925 \cdot 273256 \cdot 3659566 \cdot 9646341 \cdot 43388 \cdot 2694801 \cdot 279832 \cdot 3573569 \cdot 9630060 \cdot 2258 \cdot 2750781 \cdot 286115 \cdot 3 \cdot 495087 \cdot 9614219 \cdot 3 \cdot 495087 \cdot 3 \cdot 495087 \cdot 3 \cdot 495087 \cdot 3 \cdot 4 \cdot 4$	$18 \cdot 2638730 \cdot 273569 \mid 3 \cdot 655384 \cdot 9645574 \mid 42 \mid 39 \cdot 2697602 \mid 280145 \mid 3 \cdot 569568 \mid 9629275 \mid 21 \mid 59 \mid 2753577 \mid 286430 \mid 3 \cdot 491247 \mid 9613418 \mid 286430 \mid 286$	$19.2641536.273881\ 3.651211.9644806\ 41\ 40.2700403\ .280459\ 3.565574\ .9628490\ 20\ 60\ .2756374\ .286745\ 3.487414\ .9612617$		m
E	Tang.	-280773	281087	-281401	281715	-282029	-282343	282657	.282971	-283285	.283599	-283914	-284228	-284543	-284857	-285172	-285486	.285801	-286115	-286430	286745		
	Sine.	-2703204	-2706004	2708805	2711605	2714404	2717204	-2720003	2722802	2725601	2728400	2731198	2733997	2736794	2739592	2742390	2745187	2747984	2750781	2753577	2756374		
5	-	4.1	42	43	44	45	46	47	48	49	20	51	52	53	54	55	99	22	58	59	09		•
-		39	38	337	136	35	34	33	32	31	30	29	28	27	126	25	24	53	55	21	20		3
	Cosine.	9643268	9642497	9641726	-9640954	-9640181	9639407	9638635	9637858	9637081	9636305	-9635527	.9634748	-9633969	9633189	9632408	9631626	-9630843	9630060	9629275	9628490		
	Cotang.	3-642891	3-638744	3-634606	3-630477	3-626356	3-622244	3-618141	3-614046	3-609960	3-605883	3.601814	3-597754	3-593702	3-589659	3-585624	3-581597	3-577579	3-573569	3-569568	3-565574		
THE STATE OF	Tang.	274507	-274820	275133	275445	827575	276071	276385	869912	277011	277324	277637	277951	278264	818578	168812	279205	279518	279832	280145	280459	Ų	
	Sine.	2647147	2649952	2652757	2655561	2658366	2661170	2663973	2666777	2669581	2672384	2675187	2677989	2680792	2683594	2686396	2689198	2692000	2694801	2697602	2700403		
1		21	22	53	24	25	56	27	88	58	30	31	35	33	34	35	36	37	38	39	40		
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	Cosme.	9659258	-9658505	9657751	9669696	9656240	-9655484	9654726	9653968	9653209	9652449	-9651689	-9650927	-9650165	-9649402	9648638	9647873	9647108	-9646341	9645574	9644806	POTTOR.	
	Tang. Cotang.	3-732050	3-727713	3-723384	3-719065	3-714756	3-710455	3-706164	3-701883	3-697610	3-693346	3.689092	3-684847	3-680611	3-676384	3-672166	3-667957	3-663757	3-659566	3-655384	3-651211	0*07*0.0	
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	Sime.	2588190	-2591000	2593810	-2596619	-2599428	2602237	2605045	2607853	2810662	2613469	-2616277	-2619085	2621892	2624699	2627506	2630312	2633118	2635925	-2638730	19 -2641536 -273881 3-651211 -9644806 41	*10110*	
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	0-2923717	305730	-2923717 305730 3-270852 9563048 6021 -2982079 312422 3-200789 9545009 3941 3037559 318820 3-136563 9527499 19	9563048	60	1 2	982079	312422	3-200789	-9545009	88	303	17559	318820	3-136563	9527499	<u> </u> ≘
	1.2926499	306048	$ \cdot 3926499 \cdot 306048 \cdot 3 \cdot 267452 \cdot 9562197 \cdot 5922 \cdot 2984856 \cdot 312742 \cdot 3 \cdot 97521 \cdot 9544141 \cdot 3842 \cdot 3040331 \cdot 319140 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 4 \cdot 9526615 \cdot 18 \cdot 3 \cdot $	9562197	592	33	984856	312742	3.197521	9544141	38	2 304	0331	319140	3.133414	9526615	8
-	2 , 2929280 306367 3 264059 9561345 58 9 23 2987632 313061 3 · 194259 9543273 37 4 3 3043102 \cdot 319461 3 · 130270 9525730 17	1-306367	3.264059	9561345	585	<u> </u>	987632	313061	3.194259	9543273	374	3 304	3102	319461	3.130270	9525730	=
_	8 - 2932061	-306685	$\cdot 2932061 \cdot 306685 \cdot 3 \cdot 266672 \cdot 9560492 \cdot 5724 \cdot 2990408 \cdot 313381 \cdot 3 \cdot 191003 \cdot 9542403 \cdot 3644 \cdot 3045872 \cdot 319781 \cdot 3 \cdot 27131 \cdot 9524844 \cdot 166 \cdot 1$	-9560492	572	4/2	80408	.313381	3.191003	9542403	364	4-304	5872	319781	3-127131	-9524844	16
_	4 -2934842	307003	$\cdot 2934842 \cdot 307003 \cdot 3 \cdot 257292 \cdot 9559639 \cdot 5625 \cdot 2993184 \cdot 313700 \cdot 3 \cdot 187754 \cdot 9541533 \cdot 3546 \cdot 3048643 \cdot 320102 \cdot 3 \cdot 123999 \cdot 9523958 \cdot 15 \cdot 12 \cdot 12 \cdot 12 \cdot 12 \cdot 12 \cdot 12 \cdot 12$.9559639	562	22	993184	.313700	3-187754	9541533	354	5 304	8643	320102	3-123999	9523958	15
	5 2937623	307321	$\cdot 3937623 \cdot 307321 \cdot 3 \cdot 253918 \cdot 9558785 \cdot 5526 \cdot 2995959 \cdot 314020 \cdot 3 \cdot 184510 \cdot 9540662 \cdot 3446 \cdot 3051413 \cdot 320423 \cdot 3120872 \cdot 9523071 \cdot 32371 \cdot 3$	-9558785	552	9	995959	.314020	3.184510	.9540662	344	6-305	1413	320423	3.120872	9523071	Ξ
	6 2940403	307640	$\cdot 2940403 \cdot 307640 \cdot 3 \cdot 250550 \cdot 9557930 \cdot 5427 \cdot 2998734 \cdot 314339 \cdot 3 \cdot 181272 \cdot 9539790 \cdot 3347 \cdot 3054183 \cdot 320744 \cdot 3 \cdot 117750 \cdot 9522183 \cdot 3204790 \cdot 32047 \cdot 3054183 \cdot 320744 \cdot 3 \cdot 117750 \cdot 9522183 \cdot 33047 \cdot 3054183 \cdot 320744 \cdot 3 \cdot 117750 \cdot 9522183 \cdot 33047 \cdot 3054183 \cdot 320744 \cdot 3 \cdot 117750 \cdot 9522183 \cdot 330744 \cdot 3 \cdot 117750 \cdot 9522183 \cdot 952218 \cdot 9$.9557930	542	-	998734	.314339	3.181272	9539790	334	7 305	4183	320744	3.117750	9522183	Ξ
_	7 2943183	307958	$ \cdot 3943183 \cdot 307958 \cdot 3 \cdot 247189 \cdot 9557074 \cdot 5328 \cdot 39001509 \cdot 314689 \cdot 3 \cdot 78040 \cdot 9538917 \cdot 32488 \cdot 3056953 \cdot 321064 \cdot 3 \cdot 114636 \cdot 9521294 \cdot 1288 \cdot 32408 \cdot 321064 \cdot 3 \cdot 114636 \cdot 3 $	-9557074	532	80	001209	31 1659	3.178040	9538917	324	8 305	6953	321064	3-114635	-9521294	12
_	$8 \cdot 2945963 \cdot 308277 \cdot 3 \cdot 243834 \cdot 9556218 \cdot 5229 \cdot 3004284 \cdot 314979 \cdot 3 \cdot 174814 \cdot 9538044 \cdot 31499 \cdot 3059723 \cdot 321386 \cdot 3 \cdot 111625 \cdot 9520404$	308277	3.243834	9556218	523	6	1004284	.314979	3.174814	9538044	314	9 305	9723	321385	3-111525	9520404	Ξ
_	9.2948743 308595 3.240486 9555361 $5130.3007058.315298$ 3.171594 9537170 3050.3050 3062492 321706 3.108421 9519514 10	-308595	3.240486	9555361	513	흫	007058	.315298	3-171594	9537170	305	908-0	2492	321706	3.108421	·95T9514	$\frac{2}{2}$
=	$10^{\circ} - 2951522^{\circ} - 306914^{\circ} - 3237143^{\circ} - 9554502^{\circ} - 5031^{\circ} - 3009832^{\circ} - 315618^{\circ} - 168380^{\circ} - 9536294^{\circ} - 2951^{\circ} - 3065261^{\circ} - 322027^{\circ} - 3105322^{\circ} - 9518623^{\circ} - 9$	-308914	3.237143	9554502	503	$\frac{3}{2}$	009832	.315618	3.168380	9536294	295	1 306	5261	322027	3.105322	9518623	
_	$1 \cdot 2954302 \cdot 309233 \cdot 3\cdot 233307 \cdot 9593643 \cdot 49 \cdot 32 \cdot 3012606 \cdot 315938 \cdot 3\cdot 165172 \cdot 9535418 \cdot 2862 \cdot 8068030 \cdot 322348 \cdot 3\cdot 102229 \cdot 9517731 \cdot 3068030 \cdot 3068030 \cdot 322348 \cdot 38889 \cdot 38888 \cdot 388888 \cdot 38888 \cdot 388888 \cdot 38888 \cdot 38888$	309233	3-233807	-9553643	493	63	1012606	-315938	3.165172	9535418	285	2 806	8030	322348	3-102229	9517731	w
Ξ	12° 2957081 \cdot 309551 $3\cdot$ 230478 \cdot 9552784 \cdot 48 \mid 33 \cdot 3015380 \cdot 316258 \mid 3·161970 \cdot 9534542 \mid 27 \mid 57070798 \mid 322670 \mid 3·099141 \mid 9516838	.309551	3-230478	-9552784	483	33	015380	•316258	3.161970	9534542	275	3 307	0798	322670	3.099141	:9516838	
=	$13_{1}2959859 \cdot 309870 \cdot 327154 \cdot 9551923 \cdot 47 \cdot 34 \cdot 3018153 \cdot 316578 \cdot 315874 \cdot 9533664 \cdot 26 \cdot 54 \cdot 3073566 \cdot 322991 \cdot 3 \cdot 956059 \cdot 9515914 \cdot $.309870	3.227154	-9551923	473	<u>4</u>	018153	316578	3.158774	9533664	265	4 307	3566	322991	3-096059	9515944	_
_	$14 \cdot 2962638 \cdot 310189 \cdot 3 \cdot 223837 \cdot 9551062 \cdot 46 \cdot 35 \cdot 3920926 \cdot 316898 \cdot 3155584 \cdot 952786 \cdot 25 \cdot 55 \cdot 3076334 \cdot 323312 \cdot 3 \cdot 92983 \cdot 951 \cdot 050 \cdot 305786 \cdot 35 \cdot 35786 \cdot 35 \cdot 35786 \cdot 35 \cdot 35786 \cdot 3578786 \cdot 35786$.310189	3-223837	-9551062	463	35	926020	.316898	3-155584	9532786	255	5 307	6334	323312	3-092983	-951:050	٩
=	$15 \cdot 2965416 \cdot 310508 \cdot 3220526 \cdot 9550199 \cdot 45 \cdot 3699 \cdot 317218 \cdot 317218 \cdot 3152399 \cdot 9531907 \cdot 2456 \cdot 3079102 \cdot 323633 \cdot 3089912 \cdot 9514154 \cdot 323633 \cdot 32363$	310508	3.220526	9550199	453	÷	1023699	317218	3.152399	9531907	245	6 307	9102	323633	3.089912	9514154	4
Ξ	$(6 \cdot 3968194 \cdot 310827 \mid 3 \cdot 217221 \mid \cdot 954938 \mid 44 \mid 37 \cdot 3026471 \mid \cdot 317538 \mid 3 \cdot 149220 \mid \cdot 9531027 \mid 23 \mid 57 \mid \cdot 3081869 \mid \cdot 323955 \mid 3 \cdot 086846 \mid \cdot 9513258 \mid 3 \cdot 149220 \mid \cdot 9531027 \mid 23 \mid 57 \mid \cdot 3081869 \mid \cdot 323955 \mid 3 \cdot 086846 \mid \cdot 9513258 \mid 3 \cdot 086846 \mid \cdot 368846 \mid \cdot 36$.310827	3-217221	9549336	443	7	1026471	.317538	3.149220	9531027	235	7 -308	1869	323955	3.086846	9513258	
=	$17\cdot2970971\cdot311146\mid3\cdot213922\cdot9548473\mid43\mid38\mid\cdot3029244\mid\cdot317859\mid3\cdot146047\cdot9530146\mid22\mid58\mid\cdot3084636\mid\cdot324276\mid3\cdot083786\mid\cdot9512361\mid17\cdot3970971\mid311146\mid3\cdot21392\mid4973\mid43\mid39\mid391391\mid39113911$.311146	3.213922	9548473	433	8	029244	.317859	3.146047	9530146	225	8 -308	4636	324276	3.083786	9512361	
쿠	18 2973749 311465 3210630 9547608 42 39 3032016 318179 3142880 9529264 21 59 3087403 324598 3080732 9511464 31 4641 31	311465	3.210630	9547608	423	<u>:</u>	032016	318179	3.142880	9529264	215	80E-16	7403	324598	3-080732	9511464	Ξ
프	$\textbf{19.2976526} \cdot \textbf{311784} \cdot \textbf{3.207344} \cdot \textbf{9546743} \cdot \textbf{41} \cdot \textbf{40} \cdot \textbf{3034788} \cdot \textbf{318499} \cdot \textbf{3139719} \cdot \textbf{9528382} \cdot \textbf{20} \cdot \textbf{60} \cdot \textbf{3090170} \cdot \textbf{324919} \cdot \textbf{3-077683} \cdot \textbf{9510565} \cdot \textbf{3077683} \cdot \textbf{9510565} \cdot \textbf{3077683} \cdot \textbf{9610565} \cdot \textbf{3077683} \cdot \textbf{9610665} \cdot \textbf{9610665} \cdot \textbf{3077683} \cdot \textbf{9610665} \cdot \textbf{96106665} \cdot \textbf{9610665} \cdot \textbf{96106665} \cdot \textbf{96106665} \cdot \textbf{96106665} \cdot \textbf{96106665} \cdot \textbf{96106665} \cdot $	-311784	3.207344	-9546743	414	<u> </u>	034788	318499	3.139719	9528382	20	<u>608-</u> 0	0170	324919	3-077683	-9510565	_
<u> </u>	20.2979303 312103 3204063 9545876 40	-312103	3.204063	9545876	40						•	_					
-	Cosine. Cotang.	Cotang.	Tang.	Sine.	<u> </u>	-	Josine.	Cosine. Cotang.	Tang.	Sine.	 	S - -	ine.	/ Cosine. Cotang.	Tang.	Sine.	<u></u>
!				Deg. 72.	્રં					Deg. 72.	çě		-			Deg. 72.	2
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18 Deg.

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Cosine.	-9473035	.9472103	201211	9471170	-9470236	9469301	-9468366	.9467430	-9466493	-9465555	.9464616	.9463677	9462736	.9461795	9460854	.9459911	.9458968	-9458023	9457078	-9456132	9425186		Sine.	Dec 71
Cotang.	2-957205	2.954372		2-951545	2.948722	2.945905	2.943092	2.940284	2-937480	2.934682	2.931888	2-929099	2.926315	2-923535	2-920761	2-917990	2.915225	2.912464	2.909708	2.906957	2.904210		Tang.	
Tang.	338157	338481	100000	338805	.339129	339454	877988	-340103	340427	340752	-341077	-341401	.341726	-342051	342376	342701	.343026	343351	-343677	344002	344327		Cotang.	
Sine.	3203374	3206130	2000000	3208885	3211640	3214395	3217149	3219903	3222657	3225411	3228164	3230917	3233670	3236422	3239174	3241926	3244678	3247429	3250180	3252931	3255682		Cosine. Cotang.	
	941	842		743	644	545	446	347	248	149	020	951	8 52	753	654	555	456	357	258	159	090		1	
Cosine.	$0.5090170.3249193.077683.95105656021-3148209+3316863\cdot014892\cdot949151113941+3203374+3381572\cdot957206+947303511941+3203374+3381572\cdot957206+947303511941+3203374+3381572\cdot957206+347303511941+3203374+3381572\cdot957206+347303511941+3203374+3381572\cdot957206+347303511941+3203374+3381572\cdot957206+347303511941+3203374+3381572\cdot957206+347303511941+3203374+3381572\cdot957206+347303511941+320374+3381572\cdot957206+347303511941+3370374+3381572\cdot957206+347303511941+3370374+3381572\cdot957206+347303511941+3370374+3381572\cdot957206+347303511941+3370374+3381572\cdot967206+347303511941+3703744+370374+370374+370374+370374+370374+370744+370744+370744+370744+370744+370744+370744+370744+370744+370744+3707444+3707444+3707444+3707444+3707444+3707444+3707444+3707444+3707444+3707444+37074444+37074444+37074444+37074444+37074444+37074444+37074444+3707444444+370744444+37074444444444$	3092936 -325241 3-074640 -9509666 5925 -3150969 -332009 3-011960 -9490595 3842 -3206130 -338481 2-954372 -9472103 18	00000000	3095702 325563 3071602 9508766 5823 3153730 332332 3009033 9489678 3743 3208855 338805 2951545 9471170117	$\cdot 3098468 \cdot 325884 \cdot 3 \cdot 068569 \cdot 9507865 \cdot 5724 \cdot 3156490 \cdot 332655 \cdot 3 \cdot 006110 \cdot 9488760 \cdot 3644 \cdot 3211640 \cdot 339129 \cdot 2 \cdot 948722 \cdot 9470236 \cdot 1640 \cdot 3211640 \cdot 32116$	3101234 326206 3065542 9506963 5626 3159250 332978 3003193 9487842 3545 3214395 329454 2945905 9469301 115	$3103999 \cdot 326528 \cdot 9506061 \cdot 5526 \cdot 3162010 \cdot 333302 \cdot 3000282 \cdot 9486922 \cdot 3446 \cdot 3217149 \cdot 339778 \cdot 2943092 \cdot 9468366 \cdot 1486 \cdot 3217149 \cdot 339778 \cdot 2943092 \cdot 9468366 \cdot 1486 \cdot 3217149 \cdot 339778 \cdot 2943092 \cdot 9468366 \cdot 1486 \cdot 3217149 \cdot 339778 \cdot 2943092 \cdot 9468366 \cdot 1486 \cdot 3217149 \cdot 339778 \cdot 2943092 \cdot 9468366 \cdot 148678 \cdot 14$	$\cdot 3106764 \cdot 326850 \mid 3 \cdot 059503 \mid \cdot 9505157 \mid 5427 \mid \cdot 3164770 \mid \cdot 333625 \mid 2 \cdot 997375 \mid \cdot 9486002 \mid 3347 \mid \cdot 3219903 \mid \cdot 340103 \mid 2 \cdot 940284 \mid \cdot 9467430 \mid 1367770 \mid \cdot 3167770 \mid \cdot 3167700 \mid \cdot 31677000 \mid \cdot 316770000 \mid \cdot 3167700000 \mid \cdot 3167700000000 \mid \cdot 3167700000000000000000000000000000000000$	$-3109529 \cdot 327172 \cdot 9.056492 \cdot 9504253 \cdot 53253 \cdot 5328 \cdot 3167529 \cdot 33394 \cdot 2.994473 \cdot 9485081 \cdot 3248 \cdot 3222657 \cdot 340427 \cdot 2.937480 \cdot 9466493 \cdot 1223657 \cdot 23487 \cdot 23487 \cdot 23487 \cdot 23487 \cdot 23480 \cdot 2348$	$\cdot 3112294 \cdot 327494 \cdot 327494 \cdot 95033487 \cdot 9503348 \cdot 5229 \cdot 3170288 \cdot 334271 \cdot 2\cdot 991576 \cdot 9484159 \cdot 3149 \cdot 3225411 \cdot 340752 \cdot 2\cdot 934682 \cdot 9465555 \cdot 112294 \cdot 3229411 \cdot 340752 \cdot 2\cdot 934682 \cdot 9465555 \cdot 112294 \cdot 3229411 \cdot 340752 \cdot 2\cdot 934682 \cdot 9465555 \cdot 112294 \cdot 3229411 \cdot 340752 \cdot 2\cdot 934682 \cdot 9465555 \cdot 112294 \cdot 3229411 \cdot 340752 \cdot 323487 \cdot 3229411 \cdot 340752 \cdot 323487 \cdot 3229411 \cdot 340752 \cdot 323487 \cdot 3229411 \cdot 3229$	$9 \cdot 3115058 \cdot 327816 \cdot 3650486 \cdot 9502443 \cdot 51 \cdot 30 \cdot 3173047 \cdot 334595 \cdot 2988685 \cdot 9483237 \cdot 3050 \cdot 3228164 \cdot 341077 \cdot 2931888 \cdot 9464616 \cdot 10931888 \cdot 341077 \cdot 3931888 \cdot 39464616 \cdot 391888 \cdot 391888$	$0 \cdot 3117822 \cdot 328138 \cdot 3 \cdot 047491 \cdot 9501636 \cdot 50 \cdot 31 \cdot 3175805 \cdot 334918 \cdot 2 \cdot 985798 \cdot 9482313 \cdot 29590917 \cdot 341401 \cdot 2 \cdot 929099 \cdot 9463677 \cdot 341768 \cdot 2 \cdot 328138 \cdot 2 \cdot 328138 \cdot 2 \cdot 328138 \cdot 3 \cdot$	$(1 \cdot 3120586 \cdot 328461 \cdot 3044501 \cdot 9500629 + 9932 \cdot 3178563 \cdot 335242 \cdot 2982916 \cdot 9481389 \cdot 2862 \cdot 3233670 \cdot 341726 \cdot 292315 \cdot 9462736 \cdot 292316 \cdot 2926316 \cdot 2926416 \cdot 2926416 \cdot 2926616 \cdot $	$ (2 \cdot 3123349 \cdot 328783 \cdot 3 \cdot 041617) \cdot 949972 \cdot 148 \cdot 33 \cdot 318132 \cdot 33556 \cdot 3980040 \cdot 9480464 \cdot 27 \cdot 53 \cdot 3236422 \cdot 34205 \cdot 2923535 \cdot 9461795 \cdot 34205 \cdot 2923535 \cdot 3923635 \cdot 3923637 \cdot 392367 \cdot 3923677 \cdot 392367 \cdot 392367$	(3/3126112/329105/393838/9498812/47/34/3184079/335889/2.977168/9479538/26/54/32376/2.92076/1/9460854/23184079/298124/29814/298814/2988124/298814/298814/298814/298814/298814/298814/29	$4 \cdot 3128875 \cdot 329428 \cdot 3 \cdot 295564 \cdot 9497902 \cdot 46 \cdot 35 \cdot 3186836 \cdot 336213 \cdot 2974301 \cdot 9478612 \cdot 2555 \cdot 3241926 \cdot 342701 \cdot 2 \cdot 917990 \cdot 9459911 \cdot 9478612 \cdot 25974301 \cdot 9478612 \cdot 259786 \cdot 242701 \cdot 2 \cdot 917990 \cdot 9459911 \cdot 948786 \cdot 2 \cdot $	$15 \cdot 3131638 \cdot 329750 \cdot 3 \cdot 032595 \cdot 949699 \cdot 45 36 \cdot 3189593 \cdot 336537 \cdot 2 \cdot 971439 \cdot 9477684 \cdot 24 56 \cdot 3244678 \cdot 343026 \cdot 2 \cdot 915225 \cdot 9458968 \cdot 21868 \cdot 21$	$6 3134400 330073 3 \cdot 029632 \cdot 9496080 44 37 \cdot 3192350 \cdot 336861 2 \cdot 968583 \cdot 9476756 23 57 \cdot 3247429 \cdot 343351 2 \cdot 912464 \cdot 9458023 1 \cdot 948608 \cdot 9486083 1 \cdot 948$	$3137163 \cdot 330395 \cdot 3.026673 \cdot 9495168 \cdot 4338 \cdot 3195106 \cdot 337185 \cdot 2.965731 \cdot 9475827 \cdot 2258 \cdot 3250180 \cdot 343677 \cdot 2.909708 \cdot 9457078 \cdot 2.909708 \cdot 2.90970$	$8 \cdot 3139925 \cdot 330718 \cdot 3 \cdot 023720 \cdot 9494255 \cdot 4239 \cdot 3197863 \cdot 337509 \cdot 3 \cdot 962884 \cdot 9474897 \cdot 21 \cdot 59 \cdot 3252931 \cdot 344002 \cdot 2 \cdot 906957 \cdot 9456132 \cdot 3 \cdot 3 \cdot 2 \cdot$	$ \textbf{99} \cdot \textbf{3142686} \cdot \textbf{331041} \cdot \textbf{3-020772} \cdot \textbf{9493341} \cdot \textbf{41} \cdot \textbf{40} \cdot \textbf{3200619} \cdot \textbf{337833} \cdot \textbf{2-960042} \cdot \textbf{9473966} \cdot \textbf{20} \cdot \textbf{60} \cdot \textbf{3255682} \cdot \textbf{344327} \cdot \textbf{2-904210} \cdot \textbf{9455186} \cdot \textbf$		Sine,	,
Cotang.	3-014892	3-011960	000000000000000000000000000000000000000	3-009033	3-006110	3-003193	3-000282	2-997375	2-994473	2-991576	2.988685	861286-2	2.982916	2-980040	891776-2	2-974301	2.971439	2.968583	2-965731	2.962884	2-960042		Tang.	
Tang.	331686	339009	200000	332332	332655	332978	-333302	333625	∙33394€	334271	334595	334918	335242	-335566	335889	.336213	-336537	.336861	-337185	-337509	.337833		Cotang.	
Sine.	3148209	3150969	000000000000000000000000000000000000000	3153730	3156490	3159250	3162010	3164770	3167529	3170288	3173047	3175805	3178563	3181321	3184079	3186836	3189593	3192350	3195106	3197863	3200619		/ Cosine	
	021	929	1	823	724	625	526	4 27	328	229	130	031	932	8 33	7.34	635	536	437	338	239	140	0	' '	
Cosine.	9510565 6	9509666 5	000000	9508766 5	9507865 5	9506963 5	9506061 5	9505157 5	9504253,5	9503348 5	9502443 5	9501536	9500629 4	9499721	9498812	9497902	9496991	9496080	9495168	9494255	9493341	9492426 4	Sine.	5
Cotang.	3.077683	3-074640	OT IN	3.071602	3.068569	3.065542	3-062520	3-059503	3-056492	3-053487	3-050486	3.047491	3.044501	3-041517	3.038538	3-035564	3-032595	3-029632	3.026673	3-023720	3-020772	20.3145448 331363 3.017830 .9492426 40	Tang.	
Tang.	324919	395941	Tanana.	325563	325884	-326206	-326528	.326850	327172	-327494	.327816	-328138	328461	.328783	329105	.329428	329750	-330073	330395	-330718	331041	-331363	Cotang.	
Sine.	3090170	3092936	0000000	3095702	3098468	3101234	3103999	3106764	3109529	3112294	3115058	3117822	3120586	3123349	3126112	3128875	3131638	3134400	3137163	3139925	3142686	3145448	Cosine, Cotang.	
	0	-		63	60	4			7	00	6	10	I	12	13	14	15	16	17	18	19	50	-	

Deg. 70.

Deg. 70.

NATURAL SINES AND TANGENTS TO A RADIUS 1.

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	Tang. Cotang.	Cosme.	1	,	Sine.	Tang.	Cotang.	Cosine.	,1,	Sine.	Tang.	Cotang.	Cosine.	-
N	2.904210	9455186	80 2	13	313379	351175	2.847583	9435122	39 41	-336821	4 -357723	0.3255682 344327 2.904210 9455186 80 21 3313379 351175 2.847583 9435122 3941 3368214 357723 2.795453 9415686	9415686	19
20	2.901468	.9454238	592	.8.	316123	351501	2.844935	9434157	38 42	337095	3 -358051	$\cdot 3258432 \cdot 384653 \cdot 2901468 \cdot 99454238 \cdot 59523 \cdot 3316123 \cdot 331501 \cdot 2844935 \cdot 9434157 \cdot 3842 \cdot 3370953 \cdot 358051 \cdot 2.792891 \cdot 9414705 \cdot 3370953 \cdot 358051 \cdot 3792891 \cdot 370705 $	9414705	20
00	2.898731	-9453290	58 2	33.3	318867	351828	2.842292	.9433192	3743	-337369	1.358380	$3261182 \cdot 344978 \cdot 2898731 \cdot 9453290 \cdot 58 \cdot 283 \cdot 3318867 \cdot 351828 \cdot 2842292 \cdot 9433192 \cdot 3743 \cdot 3373691 \cdot 358380 \cdot 2790333 \cdot 9413724 \cdot 37824 \cdot 3873691 \cdot 37824 \cdot 387373691 \cdot 37824 \cdot 3873736 \cdot 387376 \cdot 38776 \cdot$	-9413724	17
4	2.895998	.9452341	572	4 .3	1119128	352155	2.839653	-9432227	3644	337642	9 358708	$3 \cdot 3263932 \cdot 345304 \cdot 2895998 \cdot 9452341 \cdot 57 \cdot 24 \cdot 3321611 \cdot 352155 \cdot 2839653 \cdot 9432227 \cdot 3644 \cdot 3376429 \cdot 358708 \cdot 2787780 \cdot 9412743 \cdot 38888 \cdot 388888 \cdot 388888 \cdot 38888 \cdot 388888 \cdot 38888 \cdot$	9412743	1
62	2.893270	.9451391	562	5 -3	324355	352482	2.837019	.9431260	3545	.337916	7 -359036	$\cdot 3266681 \cdot 345629 \cdot 2 \cdot 893270 \cdot 9451391 \cdot 5625 \cdot 3324355 \cdot 352482 \cdot 2 \cdot 837019 \cdot 9431260 \cdot 35455 \cdot 3379167 \cdot 359036 \cdot 2 \cdot 785230 \cdot 9411760 \cdot 356681 \cdot 346629 \cdot 356230 \cdot 346629 \cdot 366681 \cdot 346629 \cdot 366681 \cdot 36$	-9411760	15
25	2.890546	-9450441	552	8. 9	860228	352809	2.834389	.9430293	3446	.338190	5-359365	$\cdot 3269430 \cdot 345955 \cdot 2 \cdot 890546 \cdot 9450441 \cdot 55 \cdot 26 \cdot 3327098 \cdot 352809 \cdot 2 \cdot 834389 \cdot 9430293 \cdot 34466 \cdot 3381905 \cdot 259368 \cdot 2 \cdot 782685 \cdot 9410777 \cdot 2 $	-9410777	7
8	2.887827	9449489	542	17 .3	329841	353136	2.831763	-9429324	3347	.338464	2 -359693	$\cdot 3272179 \cdot 346281 \cdot 2\cdot 887827 \cdot 9449489 \cdot 54 \cdot 27 \cdot 3329841 \cdot 353136 \cdot 2\cdot 831763 \cdot 9429324 \cdot 3347 \cdot 3384642 \cdot 359693 \cdot 2\cdot 780144 \cdot 9409793 \cdot 378781763 \cdot 37878778 \cdot 3787877 \cdot 378787 \cdot 37878 \cdot 37$	9409793	13
90	2.885113	-9448537	632	8 .3	332584	353464	2.829142	-9428355	32/48	.338737	9 -360022	$\cdot 3274928 \cdot 346606 \cdot 2 \cdot 885113 \cdot 99448537 \cdot 63 \cdot 28 \cdot 3332584 \cdot 353464 \cdot 2 \cdot 829142 \cdot 9428355 \cdot 32448 \cdot 3387379 \cdot 360022 \cdot 2 \cdot 777606 \cdot 9408808 \cdot 3874928 \cdot 387498 \cdot 3874928 \cdot 3874968 $	-9408808	122
35	2.882403	-9447584	52	9 -3:	335326	353791	2.826525	-9427386	3149	339011	6 360350	$\cdot 3277676 \cdot 346932 \cdot 2\cdot 882403 \cdot 9447584 \cdot 52 \cdot 29 \cdot 3335326 \cdot 353791 \cdot 2\cdot 826525 \cdot 9427386 \cdot 3149 \cdot 3390116 \cdot 360350 \cdot 2\cdot 775073 \cdot 9407822 \cdot 3277676 \cdot 346932 \cdot 32475476 \cdot 346932 \cdot 346978 \cdot $	-9407822	=
28	2.879697	.9446630	513	30 .35	338069	354118	2.823912	9426415	30 50	-339285	2 360679	$9 \cdot 3280424 \cdot 347258 \cdot 2879697 \cdot 9446630 \cdot 5130 \cdot 3338069 \cdot 354118 \cdot 2823912 \cdot 9426415 \cdot 3050 \cdot 3392852 \cdot 360679 \cdot 2772544 \cdot 9406835 \cdot 360679 \cdot 3$	-9406835	1
184	2*876997	9445675	503	3,	340810	354446	2.821304	9425444	2951	-339558	9 -361008	$0.3283172.347584\ 28876997\ \cdot 9445675\ 50 \ 31\ \cdot 3340810\ \cdot 354446\ 2.821304\ \cdot 9425444\ 2951\ \cdot 3395589\ \cdot 361008\ 2.770019\ \cdot 9405848$	-9405848	03
01	2-874300	-9444720	493	35.35	343552	354773	2.818700	-9424471	28 52	-339832	5 361337	$\cdot 3285919 \cdot 347910 \cdot 2874300 \cdot 9444720 \cdot 49 \cdot 32 \cdot 3343552 \cdot 354773 \cdot 2818700 \cdot 9424471 \cdot 28 \cdot 52 \cdot 339825 \cdot 361337 \cdot 2767499 \cdot 9404860 \cdot 3285919 \cdot 347910 \cdot 28 \cdot 34767499 \cdot 3476799 \cdot 34767499 \cdot 34767499 \cdot 34767499 \cdot 34767499 \cdot 3476799 \cdot 347679 \cdot 3476799 \cdot 347679 \cdot 3476799 \cdot 347679 \cdot 3$.9404860	w
36	2.871608	.9443764	483	3 -3	346293	355101	001918-2	-9423498	27 53	340106	999198	$-3288666 \cdot 348236 \cdot 2\cdot871608 \cdot 9943764 \cdot 4833 \cdot 3346293 \cdot 35510 \cdot 2\cdot816100 \cdot 9423498 \cdot 2753 \cdot 3401060 \cdot 361666 \cdot 2\cdot764982 \cdot 940387 \cdot 10010 \cdot$	-9403871	-
63	2.868921	-9442807	473	14 .3	349034	-355428	2.813504	-9422525	26 54	-340379	6 -361994	3.3291413.348563 $2.868921.9442807$ $47[34.3349034.355428]$ $2.813504.9422525$ $26[54.3403796.361994]$ $2.762469.9402881$.9402881	-
89	2.866238	.9441849	463	5 .3	351775	355756	2.810913	.9421550	25 55	.340653	1 -362324	$4 \cdot 3294160 \cdot 348889 \cdot 2866238 \cdot 9441849 \cdot 46 \cdot 35 \cdot 351775 \cdot 355756 \cdot 2810913 \cdot 9421550 \cdot 25 \cdot 55 \cdot 3406531 \cdot 362324 \cdot 2759960 \cdot 9401891 \cdot 942184 \cdot 2759960 \cdot 942184 \cdot 275960 \cdot 942184 \cdot 942184 \cdot 275960 \cdot 942184 \cdot 275960 \cdot 942184 \cdot 275960 \cdot 942184 \cdot 2$	-9401891	M.S
15	2.863560	.9440890	453	6 3	354516	356084	2.808326	.9420575	24 56	.340926	5 -362653	5 3296906 349215 2863560 9440890 45 36 3354516 356084 2808326 9420575 2456 3409265 362653 2757456 9400899 380826	6680016	- Tr
45	2.860886	6 3299653 349542 2 860886 9439931	443	71.3	357256	356411	2.805743	-9419598	23 57	.341200	0 -362982	44 37 3357256 356411 2 805743 9419598 23 57 3412000 362982 2 754955 9399907	4066686-	4.4
89	2.858216	.9438971	433	8 .35	966658	956739	2.803164	9418621	22 58	341473	4 363311	$7 \cdot 3303398 \cdot 349868 \cdot 2 \cdot 858216 \cdot 943897 \cdot 43 \cdot 38 \cdot 3359996 \cdot 356739 \cdot 803164 \cdot 941862 \cdot 12256 \cdot 3414734 \cdot 363311 \cdot 2 \cdot 752458 \cdot 9398914 \cdot 3 \cdot 122568 \cdot 3414734 \cdot 363311 \cdot 2 \cdot 752458 \cdot 9398914 \cdot 3 \cdot 122568 \cdot 3414734 \cdot 363311 \cdot 3 \cdot 752458 \cdot 9398914 \cdot 3 \cdot 122568 \cdot 12256868 \cdot 122568 \cdot 1225$	-9398914	24
95	2.855551	-9438010	423	19 .3	3627351	357067	2.800590	-9417644	21 59	341746	8 -363640	8.3305144.350195 $2.855551.9438010$ $4239.33627351.357067$ $2.800590.9417644$ $2159.3417468.363640$ $2.749966.9397921$	19397921	_
21	2.852891	9437048	411	0 .3:	365475	357395	2-798019	-9416665	20 60	.342020	1 -363970	$19.3307889) \cdot 350521 \cdot 2.852891 \cdot 9437048 \cdot 41 \cdot 10 \cdot 3365475 \cdot 367395 \cdot 2.798019 \cdot 9416665 \cdot 20 \cdot 60 \cdot 3420201 \cdot 363970 \cdot 2.747477 \cdot 9396926 \cdot 20 \cdot $	-9396926	-
00	2.850234	20 3310634 350848 2.850234 9436085 40	40						-					
1	- Marie	0.0	1		-		1	1	-					

Deg. 69.

Deg. 69.

Deg. 69.

NATURAL SINES AND TANGENTS TO A RADIUS 1.

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20 Deg.

Tang. Cotaig. Cosine. Tang. Cotang. Cosine. Tang. Cotang. Cosine. Tang. Tang. Cotang. Cosine. Tang. Cotang. Cotang. Cosine. Tang. Cotang. Tang. Cotang	1	19	18	17	16	15	14	13	35	11	10	6	œ	7	9	10	4	3	ÇS	-	0		
Cotaing. Cosine. (' Sine. Tang. Cotang. Cosine. (' Sine. Tang. Cotang. Cotang. Cosine. (' Sine. Tang. Cotang. Cotan	Cosine.	9355468	9354440	9353412	9352382	9351352	9350321	9349289	9348257	9347223	9346189	9345154	9344119	9343082	9342045	9341007	9339968	9338928	9337888	9336846	9335804		Sine.
Cotaing. Cosine. (Cotang.	2.648753	2.646423	2.644096	2.641774	2.639454	2.637139	2.634827	2.632518	2.630213	2.627912	2.625614	2-623319	820129-2	2.618741		2.614176	968119-2	2.609625	2-607355	2.605089		
Cotaing. Cosine. (Tang.	-377536	.377868	378201	378533	378866	-379198	379531	379864	.380197	.380530	.380863	381196	.381529	381862	382196	.382529	.382863	383196	383530	-383864		Cotang.
Cotaing. Cosine. (Sine.	3532027	3534748	3537469	3540190	3542910	3545630	3548350	3551070	3553789	3556508	3559226	3561944	3564662	3567380	3570097	3572814	3575531	3578248	3580964	3583679		Cosine.
Sine. Tang. Cotaig. Cosine. () Sine. Tang. Cotang. Cosine. 1 3422935 364299 2-744922 -9395931 692 3-440267 3710903 2-696118 9375858 3 3425668 364529 2-744992 -9395931 692 3-448294 371565 2-691314 9374846 3 3-4326568 364529 2-742512 -9394935 5724 348579 371565 2-691314 9375858 3 342866 3-64529 2-742512 -9394935 5724 348579 371896 2-686526 9371809 3 342865 3-6528 2-732628 393994 552 6-491173 372527 2-686526 9371809 3 6-3436597 3-655948 2-732628 3-739194 552 6-491173 372527 2-686526 9371809 3 6-3436597 3-655948 2-732628 3-399194 552 6-491173 372525 2-686526 9371809 3 6-3436597 3-765948 2-732628 3-739194 552 6-491173 372525 2-686526 9371809 3 6-3436597 2-73060 7 3-429664 3-73222 7-66998 3-74218 3-42060 366607 2-72710 9388992 5279 3-496644 3-73282 2-67332 9-9367749 3 6-74479 3-725256 9387940 5130 3502074 373884 2-674621 9366722 3 6-744791 3-725256 9387940 5130 3502074 373884 2-674621 9366722 3 6-744791 3-68698 2-712526 9387940 5130 3502074 373884 2-674621 9366722 3 6-746712 3-68528 2-712642 9388992 4532 3-75521 2-665163 9366741 3-7465712 3-68528 2-713048 938192 5458 3-75521 2-665163 9366456 9366456 9388992 3-717598 3-75521 2-665163 9365456 9388992 3-701618 938192 54589 3-75521 2-665163 9366745 3-75621 2-686528 3-71682 3-71799 3-75521 2-695862 3-71799 3-71642 3-738990 4437 3-75521 2-665163 9366745 3-75521 2-695850 3-77521 2-695850 3-77521 2-655764 9385957 3-755113 3-666528 3-77529 3-775890 4437 3-75521 2-655764 9355957 2-695857 3-700936 9377880 4140 352930 377203 2-65108 9356455 2-700936 9356557 3-700936 9356555 3-77687 3	_		842	7.43	644	545	446	347	248	149	020	951	8 52	53			456	357	258	1 59	090		11
Sine. Tang. Cotaing. Cosine. Tang. Cotang. 03420201 363970 2747447 3936926 60 21 3477540 3709603 2696118 1 3422935 364209 2744592 3936935 52 3480267 371234 2693114 2 3425668 364529 2742403 5939393 57227 371565 269134 3 3425668 3745065 5939943 5625 3452994 371565 269134 4 3431133 365288 2773562 5939943 577 345399 377227 5686526 5 3436597 365948 2773503 5987944 578 345652 578578 567878 6 342060 366607 272770 9389943 578 346624 37322 567693 9 3444791 366937 272267 9389943 578 346479 566567 1 346025 367598 2722807 9386938 503 350207 37457 266588 1 344571 </td <td>Cosine.</td> <td>9375859 3</td> <td>9374846</td> <td>9373833</td> <td>9372820 3</td> <td>9371806</td> <td>9370790 3</td> <td>9869774 3</td> <td>9368758</td> <td>9367740 3</td> <td>9366722 3</td> <td>9365703 2</td> <td>9364683 2</td> <td>9363662 2</td> <td>9362641 2</td> <td>9361618 2</td> <td>9360595 2</td> <td>9359571 2</td> <td>9358547 2</td> <td>9357521 2</td> <td>9356495 2</td> <td></td> <td>Sine.</td>	Cosine.	9375859 3	9374846	9373833	9372820 3	9371806	9370790 3	9869774 3	9368758	9367740 3	9366722 3	9365703 2	9364683 2	9363662 2	9362641 2	9361618 2	9360595 2	9359571 2	9358547 2	9357521 2	9356495 2		Sine.
Sine. Tang. Cotaig. Cosine. Sine. Tang. Tang. Cosine. Sine. Tang. Cotaig. Cosine. Sine. Tang. Cotaig. Cosine. Sine. Tang. Cotaig. Cosine. Sine. Tang. Cotaig. Cotaig	Cotang.	811969-2	2.693714	2-691314	-616889.5	3-686526 ·	2.684138	3-681753	2-679372	2-676995	2.674621	3.672251	3-669885	2-667522	2-665163	3-662808	2-660456	801899-2	2-655764	2-653423	980199-2		Tang.
Sine. Tang. Cotaig. Cosine. Sine. Sine. 3429201 363970 2747477 3896926 60 21 3477540 3429201 363970 2747477 3896926 60 21 3477540 3986926 364299 3742512 9395931 5724 385729 4 3421133 365288 2742512 93994935 5724 385729 4 3431133 365288 2737562 9393940 5625 3488447 5 343059 36528 273262 93991942 5526 3491173 6 343059 36572 735093 9391942 5526 3491173 6 343059 36572 735093 9391942 5526 3491173 6 343059 36507 272267 9389943 5328 34936949 9 3444791 36697 272267 9386943 5328 3493649 9 3444791 36697 272267 9386938 50 31 350246 13 3455212 367268 272267 9386938 50 31 350479 11 345025 367598 2720362 9385942 5229 349349 68 33 3510246 13 345390 365258 271048 938192 54526 3515693 16 346390 369250 2708192 9380906 4437 352386 35134690 369250 2708192 9380906 4437 352386 351347206 3370252 9380906 4437 352386 3472085 370242 2700936 9377889 440 3529396 30 347288 370242 2700936 9377889 440 3529306 32 3474812 370272 269825 937889 4239 39 3526584 33 347288 370242 2700936 9377889 440 3529306 30 3474812 370272 269825 9376869 40	Tang.	370903	371234	371565	371896	372227	372559	372890	373221	373553	373884	374216	374547	374879	375211	375543	375875	376207	376539	376871	377203		Cotang.
Sine. Tang. Cotaig. Cosine. () 3429291 3429292 342568 364299 2744497 3996926 6021 34229235 364299 2744492 3985931 5922 3425668 364299 2744922 3985931 5922 3425668 364299 2742512 3998939 5724 4.3431133 365288 274262 3998949 5724812 5982940 5625 6.343659 365288 2773569 3991942 5526 6.343659 36528 2773568 399949 5427 6.343659 36697 2772528 39889942 5229 9.344479 36697 272261 93889942 5229 9.344479 36697 272261 93889942 5229 9.344479 36697 272261 93889942 5229 4932 11.345625 272626 9388992 4932 13.3456712 368258 2710618 938192 4437 4445990 369250 2708192 9381992 4437 44469300 369250 2708192 9381992 4437 44469300 369250 2708192 9381992 4437 346628 365580 2708769 9381992 4437 3466380 369250 2708192 9381992 4387 346132 347285	Sine.	3477540	3480267	3482994	3485720	3488447	3491173	3493898	3496624	3499349	3502074	3504798	3507523	3510246	3512970	3515693	3518416	3521139	3523862	3526584	3529306		
Sine. Tang. Cotang. Cosine. (1842935) 1863970 2.7447477-9396926 60 18422935 3.864299 2.7447477-9396926 60 18422935 3.864299 2.7447477-9396925 60 18422935 3.864299 2.7424512 9.394935 53 18428400 3.864289 2.742512 9.3949435 55 184289329 3.865288 2.735093 9.394945 54 18428929 3.86527 2.730167 9.3989943 55 18428929 3.865607 2.727710 9.3889945 52 18428929 3.86527 2.72525 6.9387940 51 1846025 3.86593 2.72526 9.3889942 52 11 3462892 3.86938 2.717920 9.3889925 47 11 346025 2.72525 6.9389999 48 11 345541 3.86859 2.715482 9.388996 44 11 346628 3.89550 2.708192 9.389996 44 11 346628 3.89550 2.708192 9.389996 44 11 346628 3.89550 2.708192 9.388998 42 11 346628 3.89550 2.708192 9.378889 42 11 346628 3.89550 2.708192 9.378889 42 11 346638 3.89550 2.708192 9.378889 42 11 346638 3.89550 2.708192 9.378889 42 11 346638 3.89550 2.708192 9.378889 42 11 346638 3.89550 2.708192 9.378889 42 12 3478812 3.70842 2.70936 9.378889 42 12 3474812 3.70872 2.698525 9.378889 42 12 3474812 3.70872 2.698525 9.378889 42 12 12 12 12 12 12 12 12 12 12 12 12 12	-	21	22	23	24	25	98	27	88	. 62	30	31	35	33	34	35	36	37	88	39	40		
Sine, Tang, Cotaig, Cosine. 1 34290201	,	9	59	58	57	56	55	54	53	52	51	150	49	48	47	46	45	44	43	42	41	40	-
Sine. Tang. Cotang. 3420201 363970 2.747477 1.3422935 364299 2.7444922 3.3425668 364629 2.747403 3.342840 364629 2.737562 5.343133 365288 2.737562 6.3439329 365278 2.730167 8.342959 365278 2.730167 8.342960 366607 2.727710 9.344791 366937 2.7252526 11.3456025 367598 2.725261 13.3456728 3.725261 13.3456390 3.69250 2.715482 13.346638 369260 2.715482 13.346638 369260 2.705769 13.346638 369260 2.705769 13.346638 369260 2.705769 13.346638 370242 2.700362 13.346638 370242 2.700362 13.346638 370242 2.7003636 20.3474812 370572 2.698525	Cosine.	9396926	9395931	9394935	9393938	9392940	9391942	9390943	9389943	9388942	9387940	9386938	9385934	9384930	9383995	9382920	9381913	9060886	9379898	9378889	9377880	9376869	Sine.
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Sine. Sine. 3422935 3422668 34226668 342366668 34336597 3436597 3436628 3444791 3452925 34452660 34452660 34452660 3446628 3466828 3466828 3466828 3466828 3466828 3466828 3466828 3466828 3466828 3466828 3472085 3472085 3474812	-	363970	364299	364629	364958	365288	365618	365948	366277	366607	366937	367268	367598	3679281	368258	368589	368919	369250	-369580	369911	370242	370572	
001188846998888888888888888888888888888888	Sine.		3422935	3425668	3428400	3431133	3433865	3436597	3439329	3442060	3444791	3447521	3450252	3452982	3455712	3458441	3461171	3463900	3466628	3469357	3472085	3474812	Cosine.
	-	0	i	_		4		9	7		6	10	11			14			17	18	19	30	-

21 Deg.

Deg. 68. 3702872 398622 2.508639 9289173 1 $\cdot 3597254 \cdot 385533 \cdot 293806 \cdot 9330582 \cdot 5526 \cdot 3654184 \cdot 392567 \cdot 2547335 \cdot 9308434 \cdot 3446 \cdot 3708276 \cdot 399296 \cdot 2504402 \cdot 9287017 \cdot 38567 \cdot 386673 \cdot 38667$ 27 3656891 392902 2-545159 9307370 3347 3710977 399634 2-502289 9285938 $-3602682 - 386202 \cdot 2-589317 - 9328488 \cdot 53288 - 3659599 - 393238 \cdot 542985 - 9306306 \cdot 3248 \cdot 3713678 - 399971 \cdot 2-500178 - 9284858 \cdot 38602682 \cdot 386202 \cdot 2-589317 \cdot 2-500178 \cdot 392871 \cdot 3600178 \cdot 392888 \cdot 3928871 \cdot 3600178 \cdot 392888 \cdot 3928888 \cdot 3928888 \cdot 392888 \cdot 3928888 \cdot 392888 \cdot 392888 \cdot$ 49 3716379 400308 2.498070 9283778 $\cdot 3608108 | \cdot 386870 | 2 \cdot 584842 | \cdot 9226390 | 51 | 30 | \cdot 3665012 | \cdot 393910 | 2 \cdot 538647 | \cdot 9304176 | 30 | 50 | \cdot 3719079 | \cdot 400646 | 2 \cdot 495966 | \cdot 9288696 | \cdot 9288696 | \cdot 3108079 | \cdot 400646 | \cdot 40066$ 3640641 390889 2 558268 9313739 3941 3694765 397611 2 515018 9292401 $19 \cdot 3635222 \cdot 390218 \cdot 2 \cdot 562664 \cdot 9315855 \cdot 4140 \cdot 3692061 \cdot 397274 \cdot 3 \cdot 517150 \cdot 9293475 \cdot 20 \cdot 60 \cdot 374606 \cdot 404026 \cdot 2 \cdot 475086 \cdot 9271839 \cdot 374606 \cdot 374606$ Cosine. 53|-3727179 -401659 2-489670 -9279447 3729878 401997 2487578 9278363 $14 \cdot 3621669 \cdot 388543 \cdot 2573711 \cdot 9321133 \cdot 46 \cdot 35 \cdot 3678541 \cdot 395591 \cdot 2527859 \cdot 9298835 \cdot 265 \cdot 565 \cdot 3732577 \cdot 402335 \cdot 2485488 \cdot 9377277 \cdot 2777277 \cdot 2777277 \cdot 2777277 \cdot 2777277 \cdot 2777777 \cdot 2777277 \cdot 277727 \cdot 277777 \cdot 277727 \cdot 277777 \cdot 277777 \cdot 277777 \cdot 277777 \cdot 277777 \cdot 2777777 \cdot 277777 \cdot 277777 \cdot 277777 \cdot 277777 \cdot 27777 \cdot 277777 \cdot 277777$ $1.7 \cdot 3629802 \cdot 389548 \cdot 2 \cdot 567073 \cdot 9317969 \cdot 4338 \cdot 3686654 \cdot 396601 \cdot 2 \cdot 521424 \cdot 9295622 \cdot 1286 \cdot 3740671 \cdot 403349 \cdot 2 \cdot 479238 \cdot 9274016 \cdot 1286 \cdot 1$ $18 \cdot 3632512 \cdot 389883 \cdot 2564867 \cdot 9316912 \cdot 1239 \cdot 3689358 \cdot 396937 \cdot 2 \cdot 519286 \cdot 9294549 \cdot 21 \cdot 59 \cdot 3743369 \cdot 403687 \cdot 22477161 \cdot 9272928$ $\cdot 3613534 \cdot 387539 \cdot 2580380 \cdot 9324290 \cdot 49 \cdot 32 \cdot 3670425 \cdot 394582 \cdot 2534323 \cdot 9302042 \cdot 28 \cdot 3724479 \cdot 401321 \cdot 2491766 \cdot 9280531 \cdot 3880531 \cdot 388057 \cdot 3880531 \cdot 388057 \cdot$ 56 -3735275 -402673 2-483402 -9276191 2-481319 -9275104 Sine. 9333718 5823 3646059 391560 2 553885 9311619 3743 3700170 398285 2 510762 Cotang. Tang. 57 -3737973 -403011 Cotang. Tang. Cosine. Sine. 21 Deg. $\cdot 3591825 \cdot 384865 \cdot 2 \cdot 598309 \cdot 9332673 \cdot 5724 \cdot 3648768 \cdot 391895 \cdot 2 \cdot 551699 \cdot 9310558 \cdot 3644$ 3675836 395255 2.530011 9299905 2654 $\cdot 3605395 \cdot 386536 \cdot 2 \cdot 587078 \cdot 9327439 \cdot 529 \cdot 3662306 \cdot 393574 \cdot 2 \cdot 540815 \cdot 9305241 \cdot 31$ 3616246 387874 2.578153 9323238 48 33 3673130 394918 2.532165 9300974 27 $15 \cdot 3624380 \cdot 388878 \cdot 2 \cdot 571495 \cdot 9320079 \cdot 45 \cdot 36 \cdot 3681246 \cdot 395928 \cdot 2 \cdot 525711 \cdot 9297765 \cdot 248878 \cdot 388878 \cdot 3$ 2-523566 -9296694 23 -Cosine Sine. Cotang. Tang. Cotang. Tang. 16 3627091 389213 2 569283 9319024 44 37 3683950 396264 Cosine. Sine. 13 3618958 388209 2.575931 9322186 47 34 3583679 383864 2.605089 9335804 6021 -3599968 -385867 2-591560 -9329535 54 Deg. 68. Cosine. Sine. 3589110 384531 2.600565 Cotang. Tang. Cotang. Tang. Cosine. Sine. 00

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6 Deg.

26 Deg.

	19	18	17	16	15	14	13	C.S.	11	01	6	00	1	9	2	0	00	65	1	0	-1		سا
Cosine.	8935021	8933714	8932406	8601868	8929288	8928480	8927169	8925858	8924546	8923234	8921920	8920606	8919291	8917975	8916659	8915342	8914024	8912705	8911385	8910065	1	Sine.	Dec. 63.
Cotang.	1.989720	1.988278	1.986838	1.985400	1.983963	1.982528	1.981095	1.979663	1.978233	1.976805	1.975378	1.973953	1.972529	1.971107	1.969637	1.968268	1-966851	1-965436	1-964022	1-962610		Tang.	
Tang.	-502583	-502947	503312	503676	-504041	-504406	504771	505136	505501	505866	506232	506597	506963	-507329	£6940g.	.508060	508426	508792	509159	509525		Cotang.	
Sine.	4490591	4493190	4495789	4498387	4500984	4503582	4506179	4508775	4511372	4513967	4516563	4519158	4521753	4524347	4526941	4529535	4532128	4534721	4537313	4539905		Cosine.	
	39 41	38 42	37 43	36 14	35 45	34 46	33 47	32 48	3149	30 50	29 51	2852	27.53	26 54	25 55	24.56	23 57	89 22	21 59	. 109 02	1	1	83
Cosine.	*8960994	8959703	8958411	8957118	8955824	8954529	8953234	8861968	8950641	8949344	8948045	8946746	8945446	8944146	8942844	8941542	8940240	8938936	8937632	8936326		Sine.	Deg. 63.
Cotang. Cosine.	2.018908	2-017433	2-015959	2.014486	2.013016	2-011547	2.010080	2.008615	2-007151	3.005689	2.004229	2-002771	2.001314	16988891	1-998405	1.996953	1.995503	994055	-809366-	.991166		Tang.	
Tang.	495317	495679	496041	496404	496766	497129	497492	497855	498218	498581	498944	499308	599671	500035	500398	500762	501126	501490 1	501854 1	502218 1			
Sine.	4438534	4441140	4443746	4446352	4448957	4451562	4454167	4456771	4459375	4461978	4464581	4467184	4469786	4472388	4474990	4477591	4480192	4482792	4485392	1487992		' Cosine. Cotang.	
	021	323	823	724	325	926	27	858	539	30	31	35	33	34	35	36	37	38	39	40	j	-	
Cosine.	4383711 487732 2.050303 8987940 6021 4438534 495317 2.018908 8960994 39111 4490591 502583 1.989720 8935021	$4386326 \cdot 488092 \cdot 2 \cdot 048791 \cdot 8986665 \cdot 5922 \cdot 4441140 \cdot 495679 \cdot 2 \cdot 017433 \cdot 8959703 \cdot 3842 \cdot 4493190 \cdot 502947 \cdot 1 \cdot 988278 \cdot 8933714 \cdot 2 \cdot 017433 \cdot 895376 \cdot 101747 \cdot 1$	$ 4288940 \cdot 488453 \cdot 2047280 \cdot 8985389 \cdot 5823 \cdot 4443746 \cdot 496041 \cdot 2015959 \cdot 8958411 \cdot 37143 \cdot 4495789 \cdot 503312 \cdot 1.986838 \cdot 8932406 \cdot 103212 \cdot 10$	$3 \cdot 4391553 \cdot 488813 \cdot 2 \cdot 045770 \cdot 8984112 \cdot 57 \cdot 24 \cdot 4446352 \cdot 496404 \cdot 2 \cdot 014486 \cdot 8957118 \cdot 36 \cdot 14 \cdot 4498387 \cdot 503676 \cdot 1 \cdot 985400 \cdot 8931098 \cdot 16 \cdot 1$	$-4394166 \cdot 489173 \cdot 2 \cdot 0 \cdot 44263 \cdot 8982834 \cdot 5625 \cdot 4448957 \cdot 496766 \cdot 2 \cdot 0 \cdot 13016 \cdot 8955824 \cdot 3545 \cdot 4500984 \cdot 504041 \cdot 983963 \cdot 8939789 \cdot 15626	+ 396779 + 89534 + 2042757 + 8981555 + 5526 + 4451562 + 497129 + 2011647 + 8954529 + 3446 + 4503582 + 504406 + 1982528 + 8928480 + 146666 + 14666 + 14666 + 14666 + 14666 + 14666 + 14666 + 14666 + 14666 + 14666 + 14666 + 14666 +	$ + 399392 \cdot 489894 \cdot 2041254 \cdot 8980276 \cdot 5427 \cdot 4454167 \cdot 497492 \cdot 2010080 \cdot 8953234 \cdot 33147 \cdot 4506179 \cdot 504771 \cdot 1981095 \cdot 8927169 \cdot 13880894 \cdot 13881095 \cdot 13881098 \cdot 1388109$	-4402004 + 990255 + 997859 + 9978996 + 93288 + 4456771 + 949855 + 2008615 + 8951938 + 3248 + 4508775 + 505136 + 979663 + 8926858 + 128268686	$8 \cdot 4404615 \cdot 490616 \cdot 2 \cdot 038251 \cdot 8977715 \cdot 5229 \cdot 4459375 \cdot 498218 \cdot 2 \cdot 007151 \cdot 8950641 \cdot 3149 \cdot 4511372 \cdot 505501 \cdot 1 \cdot 978233 \cdot 8924546 \cdot 1 \cdot 978233 \cdot 8924546 \cdot 1 \cdot 978233 \cdot 8924546 \cdot 1 \cdot 978233 \cdot 1 \cdot 978233 \cdot 1 \cdot 978$	$9.4407227 + 499977 \\ \hline{2-036763} \cdot 8976433 \\ \hline{51} 30 \\ \hline{4461978} \cdot 498581 \\ \hline{2-005689} \cdot 8949344 \\ \hline{30} \overline{50} \cdot 4513967 \\ \hline{50586} \\ \hline{1-976805} \cdot 8923234 \\ \hline{80} \overline{50} \cdot 4513967 \\ \hline{50586} \\ \hline{1-976805} \cdot 8923234 \\ \hline{80} \overline{50} \cdot 4513967 \\ \hline{80} \cdot 40000000000000000000000000000000000$	$0 4409838 491338 2 \cdot 035256 8975151 50 31 4464581 498944 2 \cdot 004229 8948045 29 51 4516563 506232 1 \cdot 976378 8921920 1409838 49138 49138 498 498 498 498 498 498 498 498 498 49$	$ \textbf{-4412448} \ \textbf{-491699} \ \textbf{2-033761} \ \textbf{-8973868} \ \textbf{49932} \ \textbf{-4467184} \ \textbf{-499308} \ \textbf{2-002771} \ \textbf{-8946746} \ \textbf{2852} \ \textbf{-4519158} \ \textbf{-506597} \ \textbf{1-973953} \ \textbf{-8920606} \ \textbf{-8946746} \ \textbf{-8952} \ \textbf{-4519158} \ \textbf{-506597} \ \textbf{-1973953} \ \textbf{-8920606} \ \textbf{-892060606} \ \textbf{-89206060606} \ \textbf{-89206060606} \ \textbf{-8920606060606} \ -89206060606060606060606060606060606060606$	24415059 + 92061 + 2032268 + 8972584 + 4833 + 4469786 + 599671 + 2001314 + 8945446 + 2753 + 4521753 + 506963 + 1972529 + 8919291 + 2001314 + 20	$13.4417668 \cdot 492422 \cdot 2030776 \cdot 8971299 \cdot 4734 \cdot 4472388 \cdot 500035 \cdot 1.999859 \cdot 8944146 \cdot 2654 \cdot 4524347 \cdot 507329 \cdot 1.971107 \cdot 8917975 \cdot 1.071107 \cdot 1.07110$	$\boxed{4420278 \cdot 492783 \cdot 2029287 \cdot 8970014 \cdot 4635 \cdot 4474990 \cdot 500398 \cdot 1998405 \cdot 8942844 \cdot 2555 \cdot 4526941 \cdot 507694 \cdot 1969687 \cdot 8916659}$	+4222887 +493145 2-027799 +8968727 45 36 +477591 +500762 +996953 +8941542 24 56 +4529536 +508060 +98268 +8915342 +891542 +89	$[6] \cdot 4425496 \cdot 493507 \cdot 2 \cdot 026313 \cdot 8967440 \cdot 4437 \cdot 4480192 \cdot 501126 \cdot 1 \cdot 995503 \cdot 8940240 \cdot 2357 \cdot 4532128 \cdot 508426 \cdot 1 \cdot 966851 \cdot 8914024 \cdot 1 \cdot $	$ 9428104 \cdot 493868 \cdot 2024828 \cdot 8966153 \cdot 4338 \cdot 4482792 \cdot 501490 \cdot 1994055 \cdot 8938936 \cdot 2258 \cdot 4534721 \cdot 508792 \cdot 1965436 \cdot 8912705 \cdot 108792 \cdot 1087$	$ \begin{array}{c} (8) + 4430712 - 494230 + 2023346 - 8964864 + 4239 - 4485392 - 501854 + 992608 - 8937632 + 2159 - 4537313 - 509159 + 964022 - 8911385 + 12064027 - $	1493319 494592 2-021865 8963575 4140 4487992 502218 1-991163 8936326 20 60 4539905 509625 1-962610 8910065 50453927 494652 20 60 4539905 509625 1-962610 8910065	1	Sine.	Dec. 63.
Cotang. Cosine.	2-050303	2.048791	2.047280	2-045770	2-044263	2-042757	3-041254	2-039751	2-038251	2-036753	3-035256	2-033761	2-032268	3-030776	-029287	662720-5	3.026313	2.024828	2.023346	2.0203865 -	1	Tang.	
Tang.	487732	488092	488453	488813	-489173	489534	488884	490255	490616	490977	491338	491699	492061	492422	492783	493145	493507	493868	494230	494592	1	Cotang.	
Sine.	4383711	4386326	4388940	4391553	4394166	4396779	4399392	4402004	4404615	4407227	4409838	4412448	4415059	4417668	4420278	4422887	4455496	4428104	4430712	4433319	-	Cosine. (
	0	-	C.S	8	4	ò	9	7	00	6	10	ij	125	13	14	15	91	É	8	ė,	ei	`	

NATURAL SINES AND TANGENTS TO A RADIUS 1. 27 Deg. 27 Deg.

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	Tang.	Cotang.	Cosine.	,	-	Sme.	Tang.	Cotang.	Cosine	, ,	Sine.	Tang.	Cotang.	Cosine.	1
100	09525	1.962610	509525 1.962610 -8910665 6021 -4594248 517244 1-933323 -8882166 3941 -4645845 -524640 1-906066 -8855288	602	4	594248	517244	1-933823	8882166	3941	4645845	-524640	1-906066	8822288	19
	16860	1.961200	$-4542497 \cdot 509891 \cdot 1961200 \cdot 8908744 \cdot 5922 \cdot 4596832 \cdot 517612 \cdot 1931945 \cdot 8880830 \cdot 3812 \cdot 4648420 \cdot 525011 \cdot 1.904719 \cdot 8853936 \cdot 100000000000000000000000000000000000$	592	22 4	596832	517612	1.931945	8880830	38 42	.4648420	.525011	1.904719	8853936	18
	10258	1.959791	4545088 510258 195979 18907423 18907423 18907423 195941 1930769 18879492 1713 186096 18907423 189074	582	33 .4	599415	186219	1.930569	8879492	37 43	4650996	525382	1,903373	8852584	17
10	10625	1.958383	-4547679 - 510625 + 463371 - 625383 - 6906100 - 6724 - 4601998 - 518350 + 629195 - 8878154 - 3644 - 4653571 - 625754 + 6002029 - 8851230 - 6247679 - 624767 - 62476	572	4.4	601998	-518350	1.929195	1818154	36 14	4653571	-525754	1.902029	8851230	16
10	16601	1-956978	$-4550269 \cdot 510991 \cdot 1956978 \cdot 8904777 \cdot 5625 \cdot 4604580 \cdot 518719 \cdot 1927822 \cdot 8876815 \cdot 35145 \cdot 4656145 \cdot 526125 \cdot 1900687 \cdot 8849876 \cdot 156145 \cdot 1864987 \cdot 18649877 \cdot 18649876 \cdot 186496 $	562	5.00	604580	-518719	1.927822	8876815	35 45	4656145	.526125	1.900687	8849876	15
102	11358	1-955573	$\textbf{-4552859} \cdot 511358 \cdot 955573 \cdot 8903453 \cdot 5526 \cdot 4607162 \cdot 519089 \cdot 926451 \cdot 8875475 \cdot 3446 \cdot 4658719 \cdot 526496 \cdot 899346 \cdot 8848522 \cdot 526496 \cdot 626496 $	55 2	16.4	607162	-519089	1.926451	8875475	34 46	4658719	526496	1.899346	8848522	14
5	11725	1-954171	$-4555449 \cdot 511725 \cdot 1954171 \cdot 9902128 \cdot 5427 \cdot 4609744 \cdot 519458 \cdot 1925081 \cdot 8874134 \cdot 3347 \cdot 4661293 \cdot 526868 \cdot 1898006 \cdot 8847166 \cdot 1387418 \cdot 1887418 \cdot 18$	542	1. 4	609744	519458	1.925081	8874134	3347	.4661293	-526868	1-898006	8847166	13
10	12093	1.952770	$\textbf{-4558038} \cdot 512093 \cdot 1.952770 \cdot 8900803 \cdot 5328 \cdot 4612325 \cdot 519827 \cdot 1.923713 \cdot 8872793 \cdot 3218 \cdot 4663866 \cdot 527240 \cdot 1.896668 \cdot 8845810 \cdot 1.896668 \cdot 1.89668 \cdot 1.896668 \cdot 1.896668 \cdot 1.896668 \cdot 1.896668 \cdot 1.896668 \cdot 1.896688 \cdot 1.896668 \cdot 1.896668 \cdot 1.89668 \cdot 1.896688 \cdot 1.896888 \cdot 1.896688 \cdot 1.896688 \cdot 1.896688 \cdot 1.896688 \cdot 1.896888 \cdot 1.89688 \cdot 1.896888 \cdot 1.89688 \cdot 1.89688 \cdot 1.89688 \cdot 1.896888 \cdot 1.896888 \cdot 1.896888 \cdot 1.896888 \cdot 1.89688 \cdot 1.89688 \cdot 1.89688 \cdot 1.89688 \cdot 1.89688 \cdot 1.$	53 2	7.8	612325	519827	1.923713	8872793	32 18	4663866	.527240	1.896668	8845810	12
10	12460	1.951371	$-4560627 \cdot 512460 \cdot 951371 \cdot 9899476 \cdot 5229 \cdot 4614906 \cdot 520197 \cdot 1922347 \cdot 8871451 \cdot 3149 \cdot 4666439 \cdot 527612 \cdot 1 \cdot 895332 \cdot 8844453 \cdot 1 \cdot $	525	9.4	614906	520197	1.922347	8871451	3149	4666439	.527612	1.895332	8844453	Ξ
rů	12827	1.949973	$-4563216 \cdot 512827 \cdot 1949973 \cdot 8898149 \cdot 5130 \cdot 4617486 \cdot 520567 \cdot 1920982 \cdot 8870108 \cdot 3050 \cdot 4669012 \cdot 527983 \cdot 1893997 \cdot 8843095 \cdot 1988881 \cdot 198888 \cdot 198$	513	10 .4	617486	520567	1.920982	8870108	30 50	4669012	.527983	1-893997	8843095	10
rů	13195	1.948577	$10^{\circ} + 565804 \cdot 513195 \cdot 1.948577 \cdot 8896822 \cdot 50 \cdot 31 \cdot 462006 \cdot 520936 \cdot 1.919618 \cdot 8868765 \cdot 29 \cdot 51 \cdot 4671584 \cdot 528356 \cdot 1.892663 \cdot 8841736 \cdot 1.99668 \cdot 1.99688	503	11 4	620066	-520936	1-919618	8868765	2951	4671584	.528356	1.892663	8841736	6
10	13562	1.947182	$11.4568392 \cdot 513562 \cdot 1.947182 \cdot 8895493 \cdot 4932 \cdot 4622646 \cdot 521306 \cdot 1.918256 \cdot 8867420 \cdot 2852 \cdot 4674165 \cdot 528728 \cdot 1.891331 \cdot 8840377 \cdot 1.991331 \cdot 1.991311 \cdot 1.99$	493	7. 6	622646	521306	1.918256	8867420	28 52	.4674156	528728	1.891331	8840377	00
YO.	13930	1-945789	$ + 570979 \cdot 513930 \cdot 1945789 \cdot 8894164 \cdot 48 \cdot 33 \cdot 4625225 \cdot 521676 \cdot 1916896 \cdot 8866075 \cdot 2753 \cdot 4676727 \cdot 529100 \cdot 1890000 \cdot 8839017 \cdot 1890000 \cdot 189000000 \cdot 18900000 \cdot 18900000 \cdot 189000000 \cdot 1890000000 \cdot 1890000000 \cdot 189000000000000000000000000000000000000$	483	13 .4	625225	-521676	1.916896	6709988	2753	1-4676727	.529100	1.890000	8839017	7
rů	14298	1.944398	$3.4573566 \cdot 514298 \cdot 1.944398 \cdot 8892834 \cdot 47 \cdot 34 \cdot 4627804 \cdot 522046 \cdot 1.915537 \cdot 8864730 \cdot 26 \cdot 54 \cdot 4679298 \cdot 529472 \cdot 1.888671 \cdot 8837656 \cdot 1.988671 \cdot$	473	4 4	627804	522046	1.915537	8864730	2654	-4679298	529472	1.888671	8837656	9
10	14665	1.943008	$(4.4576153 \cdot 514665 \cdot 943008 \cdot 9891503 \cdot 4635 \cdot 4630382 \cdot 522117 \cdot 914179 \cdot 8863383 \cdot 255 \cdot 4681869 \cdot 529845 \cdot 1887343 \cdot 8836295 \cdot 188836398 \cdot 18883638 \cdot 1888368 \cdot 188868 \cdot 1$	463	15 4	630382	522117	1-914179	8863383	2555	4681869	-529845	1.887343	8836295	0
10	15033	1.941620	$4578739 \cdot 515033 \cdot 1.941620 \cdot 8890171 \cdot 4536 \cdot 4632960 \cdot 522787 \cdot 1.912823 \cdot 8862036 \cdot 2456 \cdot 4684439 \cdot 530217 \cdot 1.886017 \cdot 8834938 \cdot 1.941620 \cdot 1.94162$	453	16 4	632960	522787	1.912823	8862036	24 56	4684439	-530217	1.886017	8834933	4
rÜ	15401	1-940233	$ \begin{array}{c} \textbf{-4581325 \cdot 515401} \ \textbf{1\cdot940233} \ \cdot \textbf{-8888889} \ \textbf{-4437} \ \textbf{-4635538} \ \cdot \textbf{-523157} \ \textbf{1\cdot911469} \ \cdot \textbf{-8860688} \ \textbf{2357} \ \cdot \textbf{-4687009} \ \cdot \textbf{-530590} \ \textbf{1\cdot884692} \ \cdot \textbf{-8839569} \end{array}$	443	7- 12	635538	523157	1.911469	8890988	2857	-4687009	530590	1.884692	8833569	9
Ü	15770	1.938848	$-4583910 \cdot 515770 \cdot 1.938848 \cdot 8887506 \cdot 43 \cdot 38 \cdot 46381116 \cdot 523528 \cdot 1.910116 \cdot 8859339 \cdot 2258 \cdot 4689578 \cdot 530963 \cdot 1.883369 \cdot 8822206 \cdot 1.88389 \cdot 1.883$	433	8.4	638115	523528	1.910116	8859339	22 58	4689578	-530963	1.883369	8832206	C.S
rO	16138	1.937464	$\textbf{886496.516138} \\ \textbf{1.937464.8886172.4239} \\ \textbf{1.937464.8857989.2165} \\ \textbf{1.4640692.523899} \\ \textbf{1.908764} \\ \textbf{1.808764} \\ \textbf{1.8857989.21} \\ \textbf{2.1651.4692147.531336} \\ \textbf{1.882047.883084} \\ \textbf{1.882047.88308}	423	19 4	640692	5238991	1.908764	8857989	21 59	1-4692147	-531336	1.882047	8830841	-
ů.	16506	1-936082	$94589080 \cdot 516506 \cdot 936082 \cdot 8884838 \cdot 4140 \cdot 4643269 \cdot 524269 \cdot 907414 \cdot 8856639 \cdot 2060 \cdot 4694716 \cdot 531709 \cdot 1880726 \cdot 8829476 \cdot 8829476 \cdot 4694716 \cdot 46476 $	4114	P- 0	643269	524269	1.907414	8826639	20 60	-4694716	-531709	1-880726	8829476	0
163	16875	1-934702	20 4591665 516875 1 934702 8883503 40	40					18						
(3)	Cosine, Cotang.	Tang.	Sine.	-	,	Cosine,	Cotang.	Tang.	Sine,	'	Cosine.	Cotang.	Tang.	Sine.	-
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NATURAL SINES AND TANGENTS TO A RADIUS 1. 28 Der. 28 Des.

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-	19		17	16	15	14	13	12	11	10	6	00	-	9	10	4	3	CX	1	0		-
Cosine,	8772858	8771462	87770064	9998948	8767268	8765868	8764468	8763067	8761665	8760263	8758859	8757455	8756051	8754645	1-810252 -8753239	809008 8751832	8750425	806525 8749016	8747607	8746197		Sine.
Cotang.	1.827799	1.826537	1-825276	1.824017	1.822759	1.821502	1.820247	1-818993	1-817740	1.816489	1.815239	1.813990	1.812743	1.811496	1.810252	1.809008	1-807766	1.806525	1.805286	1.804047		Tang.
Tang.	-547106	547484	-547862	548240	548618	548997	549375	549754	-550133	52029	168099	.551270	.551650	.552029	552409	-552789	553168	553548	553928	-554309		Cotang.
Sine.	4799683	4802235	4804786	4807337	4809888	4812438	4814987	4817537	4820086	4822634	4825182	4827730	4830277	4832824	4835370	4837916	4840462	4843007	4845552	4848096		Cosine.
	17	45	43	44	45	46	47	48	49	20	51	25	53	54	55	99	57	89	69	09		
,	39	38	37	36	35	34	33	35	31	30	29	28	27	26	25	24	23	63	21	20		•
Cosine.	·880726 ·8829476 6021 ·4748564 ·539570 1 ·853325 ·8800633 3941 · 4799683 ·547106 1 ·827799 ·8772858	4697284 -532082 1-879467 -8828110 5922 -4751124 -539946 1-852035 -8799251 3842 -4802235 -547484 1-826537 -8771462	$4699852 \cdot 532455 \cdot 1.878089 \cdot 8826743 \cdot 5823 \cdot 4753683 \cdot 540322 \cdot 1.850747 \cdot 8797869 \cdot 3743 \cdot 4804786 \cdot 547862 \cdot 1.825276 \cdot 8770064 \cdot 1.8888 \cdot 1.$	$4702419 \cdot 532829 \cdot 1.876773 \cdot 8825376 \cdot 5724 \cdot 4756242 \cdot 540698 \cdot 1.849461 \cdot 8796486 \cdot 3644 \cdot 4807337 \cdot 548240 \cdot 1.824017 \cdot 1.8240$	$4704986 \cdot 533202 \cdot 1 \cdot 875458 \cdot 8824007 \cdot 5626 \cdot 4758801 \cdot 541074 \cdot 1 \cdot 848176 \cdot 8795102 \cdot 3545 \cdot 4809888 \cdot 548618 \cdot 1 \cdot 822759 \cdot 8767268 \cdot 1 \cdot 87545 \cdot 1 \cdot $	$-4707553 + 533576 + 4812438 \cdot 542445 - 8822638 \cdot 5526 \cdot 4761359 \cdot 541450 + 846892 \cdot 8793717 \cdot 3446 \cdot 4812438 \cdot 548997 + 821502 \cdot 8765868 + 8822638 \cdot 548997 + 8821502 \cdot 8765868 + 8822638 \cdot 54897 + 8821502 \cdot 8765868 + 8822638 \cdot 54897 + 8822638 \cdot 54807 + 882667 + 8822638 \cdot 54807 + 8822638 \cdot 54807 + 8822638 \cdot 54807 + 882667 + 882267 + 882267 + 882267 + 882267 + 882267 + 882267 + 8826$	$4710119 \cdot 533950 \cdot 1 \cdot 872833 \cdot 8821269 \cdot 5427 \cdot 4763917 \cdot 541826 \cdot 1 \cdot 845609 \cdot 8792332 \cdot 3347 \cdot 4814987 \cdot 549375 \cdot 1 \cdot 820247 \cdot 8764468 \cdot 1 \cdot 876468 \cdot 1 \cdot $	$4712685 \cdot 534324 \cdot 1 \cdot 871523 \cdot 8819898 \cdot 5328 \cdot 4766474 \cdot 542202 \cdot 1 \cdot 844328 \cdot 8790946 \cdot 3248 \cdot 4817537 \cdot 549754 \cdot 1 \cdot 819993 \cdot 8766067 \cdot 1 \cdot 811630 \cdot 1 \cdot $	$4715250 \cdot 534698 \cdot 1.870214 \cdot 8818527 \cdot 52\cancel{29} \cdot 4769031 \cdot 542579 \cdot 1.843049 \cdot 8789559 \cdot 31\cancel{49} \cdot 4820086 \cdot 550133 \cdot 817740 \cdot 8761665 \cdot 676167 \cdot 1.843049 \cdot 1.843049 \cdot 1.843049 \cdot 1.843048 \cdot 1.843049 \cdot 1.843$	$-4717815 \cdot 535072 \cdot 1.868906 \cdot 8817155 \cdot 5130 \cdot 4771588 \cdot 542955 \cdot 1.841770 \cdot 8788171 \cdot 3050 \cdot 4822634 \cdot 550512 \cdot 1.816489 \cdot 8760263 \cdot 8717815 \cdot 1.816489 \cdot 1.81648$	$0 + 4720380 \cdot 535446 \cdot 1867600 \cdot 8815782 \cdot 5031 \cdot 4774 \cdot 144 \cdot 543332 \cdot 1840494 \cdot 8786783 \cdot 2951 \cdot 14825182 \cdot 55089 \cdot 1875239 \cdot 8758859 \cdot 1888888 \cdot 1888888 \cdot 188888 \cdot 18888 \cdot 188888 8 \cdot 188888 \cdot 1888$	$-4722944 \cdot 535820 \cdot 1.866295 \cdot 8814409 \cdot 49 \cdot 32 \cdot 4776700 \cdot 543709 \cdot 1.839218 \cdot 8785394 \cdot 28 \cdot 523730 \cdot 551270 \cdot 1.813990 \cdot 8757456 \cdot 1.813990 \cdot 1.81390 \cdot 1.813990 \cdot 1.813990 \cdot 1.81390 \cdot 1.8$	$2 \cdot 4725508 \cdot 536195 \cdot 12864992 \cdot 8813035 \cdot 48 \cdot 133 \cdot 4779255 \cdot 544086 \cdot 1237944 \cdot 878400 \cdot 127 \cdot 153 \cdot 4830277 \cdot 551650 \cdot 12812743 \cdot 12816743 \cdot 12816744 \cdot 128167474 \cdot 12816747$	$13 \cdot 4728071 \cdot 536569 \cdot 1 \cdot 863690 \cdot 8811660 \cdot 4734 \cdot 4781810 \cdot 544463 \cdot 1 \cdot 836671 \cdot 8782613 \cdot 2654 \cdot 4832824 \cdot 552029 \cdot 1 \cdot 811496 \cdot 1 \cdot $	$14.4730634 \cdot 536944 \cdot 1 \cdot 862389 \cdot 8810284 \cdot 4635 \cdot 4 \cdot 84364 \cdot 544840 \cdot 1 \cdot 835399 \cdot 8781222 \cdot 2556 \cdot 4835370 \cdot 552409 \cdot 1 \cdot 835370 \cdot 1 \cdot $	1.851090.8808907.4536.47869191.5452171.834129.8779830.2456.4837916.5527891	$ \begin{array}{c} (6.4735759 \cdot 537694 \cdot 1.859792 \cdot 8807530 \cdot 4437 \cdot 4789472 \cdot 545595 \cdot 1.822861 \cdot 8778437 \cdot 2357 \cdot 4840462 \cdot 553168 \cdot 1.807766 \cdot 8750425 \cdot 1.822861 \cdot 8778437 \cdot 1.82861 \cdot 1.8$	$1.838069 \\ 1.858496 \cdot 8806152 \cdot 4388 \cdot 4792026 \cdot 545972 \\ 1.831593 \cdot 8777043 \\ 22 \\ 58 \cdot 4843007 \cdot 553548 \\ 1.831593 \cdot 8777043 \\ 1.83159 \cdot 877704 \\ 1.831704 \\ 1$	$18^{14740882} \cdot 538444 \\ 1\cdot 857201 \cdot 8804774 \\ 42 \cdot 89914794579 \cdot 546350 \\ 1\cdot 870327 \cdot 8775649 \\ 21 \cdot 599148552 \cdot 553928 \\ 1\cdot 805286 \cdot 8747607 \\ 1\cdot 8775649 \\ 1\cdot 159 \cdot 484555 \\ 1\cdot 539148 \\ 1\cdot 8775649 \\ 1\cdot 159 \cdot 484555 \\ 1\cdot 159 \cdot 484555 \\ 1\cdot 159 \cdot 48455 \\ 1\cdot 15$	1.829062 .8774254 20 60 .4848096 .554309 1.804047 .8746197		Sine.
Cotang.	1.853325	1-852035	1-850747	1.849461	1-848176	1.846892	1.845609	1-844328	1.843049	1-841770	1-840494	1.839218	1-837944	1.836671	1.835399	1.834129	1.832861	1-831593	1.830327	1.829062		Tang.
Tang.	-539570	539946	-540322	.540698	-541074	541450	.541826	.542202	.542579	542955	-543332	543709	-544086	-544463	.544840	-545217	-545595	545972	.546350	.546728		Cotang.
Sine.	4748564	4751124	4753683	4756242	4758801	4761359	4763917	4766474	4769031	4771588	4774144	4776700	4779255	4781810	4784364	4786919	4789472	4792026	4794579	4797131		Cosine, Cotang.
-	63	22	23	24	25	26	27	88	53	30	31	32	33	34	35	36	37	38	39	40	9,0	1/
	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	1
Cosine.	8829476	8828110	8826743	8825376	8824007	8822638	8821269	8819898	8818527	8817155	8815782	8814409	8813035	8811660	8810284	8808907	8807530	8806152	8804774	8803394	8802014	Sine.
Cotang.		1-879407	1-878089.	1-876773	1-875458	1.874145	1.872833	1.871523	1.870214	1.868906	1.867600	1.866295	1.864992	1.863690	1.862389	1.861090	1-859792	1.858496	1.857201	1.855908	1-854615	Tang.
Tang.	-531709	-532082	-532455	-532829	.533202	533576	-533950	-534324	534698	535072	535446	.535820	-536195	-536569	536944	-537319	537694	690889	538444	.538819	·539195 1·854615 ·8802014	Cotang.
Sine.	4694716 -531709	4697284	4699852	4702419	4704986	4707553	4710119	4712685	4715250	4717815	4720380	4722944	4725508	4728071	4730634	15 4733197 -537319	4735759	4738321	4740882	19 4743443 538819 1.855908 8803394 41 40 4797131 546728	20 4746004	Cosine.
	0	H	05	3	4	5	9	1	00	6	10	11	12	13	14	15	91	17	18	19	200	-

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Sine.	Tang.	_	Cotang.	Cosine.	,	' Sine.	Tang.	Cotang.	Cosine.	, ,	Sine.	Tang.	Cotang.	Cosine,	-
808	96 -5543	309	804047	-8746197	602	4848096 554309 1-804047 -8746197 6021 -4901433 -562321 1-778340 -8716419 3941 -4952060 -570004 1-754372 -8687756 19	-562321	1-778340	-8716419	39 41	4952060	-570004	1-754372	8687756	19
90	10 5546	1 688	802810	8744786	59 25	$4850640 \cdot 554689 \mid 1 \cdot 802810 \mid 3 \cdot 744786 \mid 59 \mid 22 \cdot 4903968 \cdot 562704 \mid 1 \cdot 7777130 \cdot 8714993 \mid 38 \mid 42 \cdot 4954587 \cdot 570389 \mid 1 \cdot 753186 \cdot 8686315 \mid 18 \cdot 4850640 \cdot 554689 \mid 1 \cdot 802810 \mid 1 \cdot 18 $.562704	1-777130	8714993	38 42	-4954587	.570389	1-753186	8686315	18
318	84 .5550	169	801575	8743375	58 23	$ + 4853184 \cdot 555069 \cdot 1 \cdot 801575 \cdot 8743375 \cdot 5823 \cdot 4906503 \cdot 563087 \cdot 1 \cdot 775921 \cdot 8713566 \cdot 3743 \cdot 4957113 \cdot 570775 \cdot 775202 \cdot 8684874 \cdot 1775921 \cdot 877356 \cdot 1777597113 \cdot 1777597113 \cdot 1777597117 \cdot 1777597117 \cdot 1777597117 \cdot 1777597117 \cdot 1777597117 \cdot 1777597117 \cdot 1777797 \cdot 177777 \cdot 17777 \cdot 177777 \cdot 177777 \cdot 17777 \cdot $	-563087	1-775921	8713566	37 43	-4957113	570775	1.752002	8684874	17
575	27 5554	190 1	800340	8741963	57 24	$4855727 \cdot 555450 \cdot 1 \cdot 800340 \cdot 8741963 \cdot 5724 \cdot 4909038 \cdot 563471 \cdot 774714 \cdot 8712138 \cdot 3644 \cdot 4959639 \cdot 571161 \cdot 750819 \cdot 8683431 \cdot 16611 \cdot 76611 \cdot$	-563471	1-774714	8712138	36 44	-4959639	-571161	1.750819	8683431	16
82	70 5558	331 1	799107	8740550	56 2	$ 4858270.555831 \mathbf{1\cdot 799107.8740550} 5628.94911572.563854 \mathbf{1\cdot 773507.8710710} 193545.4962165.571547 \mathbf{1\cdot 749637.8681988} 15.7858270.555831 \mathbf{1\cdot 7996316.7962165.778677} \mathbf{1\cdot 749637.79870.79870.79877} \mathbf{1\cdot 749637.79870.79870.79877} 1\cdot 7496370.7987$	563854	1-773507	8710710	35 45	-4962165	571547	1-749637	8881898	15
081	12 -5562	21111	797875	8739137	55 20	$4860812 \cdot 556211 \cdot 1797875 \cdot 8739137 \cdot 5526 \cdot 4914105 \cdot 564237 \cdot 1772302 \cdot 8709281 \cdot 3446 \cdot 4964690 \cdot 571933 \cdot 748456 \cdot 8680544 \cdot 14866 \cdot 14$	-564237	1.772302	.8709281	34 46	4964690	-571933	1.748456	8680544	14
33	54 5565	592 1	796645	8737722	54 2	$4863354 \cdot 556592 \\ 1 \cdot 796645 \\ \cdot 8737722 \\ \cdot 54 \\ \cdot 27 \\ \cdot 4916638 \\ \cdot 564621 \\ \cdot 771098 \\ \cdot 8707851 \\ \cdot 8707851 \\ \cdot 87778 \\ \cdot 4967215 \\ \cdot 572319 \\ \cdot 747276 \\ \cdot 8679100 \\ \cdot 1387 \\ \cdot 4863354 \\ \cdot 4967215 \\ \cdot 572319 \\ \cdot 47276 \\ \cdot 8679100 \\ \cdot 8879100 \\ \cdot 8879$	564621	1-771098	8707851	33 47	.4967215	-572319	1.747276	9679100	13
586	95 -5569	973 1	.795416	8736307	53 28	$ + 865895 \cdot 556973 \cdot 1 \cdot 795416 \cdot 8736307 \cdot 5328 \cdot 4919171 \cdot 565005 \cdot 1 \cdot 769895 \cdot 8706420 \cdot 3248 \cdot 4969740 \cdot 572705 \cdot 1 \cdot 746098 \cdot 8677655 \cdot 12 \cdot 746098 \cdot 3248 \cdot 746098 \cdot 746$	-565005	1.769895	8706420	32 48	-4969740	-572705	1.746098	8677655	12
84	36 -5573	355 1	794188	8734891	52 26	$ + 4868436 \cdot 557355 \cdot 1 \cdot 794188 \cdot 8734891 \cdot 52 \cdot 29 \cdot 4921704 \cdot 565388 \cdot 1 \cdot 768694 \cdot 8704989 \cdot 3149 \cdot 4972264 \cdot 573091 \cdot 1 \cdot 744921 \cdot 8676209 \cdot 1 \cdot 744921 \cdot 744921 \cdot 1 \cdot$	565388	1.768694	8704989	3149	-4972264	-573091	1-744921	8676209	11
60	77 -5577	736 1	196364	8733475	5130	$9\cdot 4879977\cdot 557736\cdot 1\cdot 792961\cdot 8733475\cdot 51\cdot 30\cdot 4924236\cdot 565772\cdot 1\cdot 767494\cdot 8703557\cdot 30\cdot 50\cdot 4974787\cdot 573478\cdot 1\cdot 743745\cdot 8674762\cdot 10\cdot 10\cdot 10\cdot 10\cdot 10\cdot 10\cdot 10\cdot 10\cdot 10\cdot 10$	-565772	1-767494	8703557	30 50	-4974787	573478	1-743745	8674762	10
351	17 -5581	11711	791736	8732058	5031	$0.4873517.558117 \\ 1.791736.8732058 \\ 50 \\ 31.4926767 \\ 566156 \\ 1.766295 \\ 1.8673217 \\ 1.766295 \\ 1.8673214 \\ 1.8673214 \\ 1.86731$	991999	1.766295	8702124	29 51	-4977310	-573864	1.742570	8673314	9
60.	57 -5584	199 1	790512	8730640	49 35	$\cdot 4876057 \cdot 558499 \cdot 1 \cdot 790512 \cdot 8730640 \cdot 4932 \cdot 4929298 \cdot 566541 \cdot 765097 \cdot 8700691 \cdot 2852 \cdot 4979833 \cdot 574251 \cdot 741396 \cdot 8671866 \cdot 10871866 \cdot 1087186$	566541	1.7655097	1690018	28 52	-4979833	.574251	1.741396	8671866	80
855	97 5588	881 1	789289	8729221	48 35	$12^{4878597\cdot558881} \cdot 789289 \cdot 8729221 \cdot 48 \cdot 33^{4931829} \cdot 566925 \cdot 1768900 \cdot 8699256 \cdot 2753 \cdot 4982355 \cdot 574638 \cdot 1740224 \cdot 8670417 \cdot 124878597 \cdot 12487859 \cdot 1248789	-566925	1.763900	8699256	27 53	-4982355	-574638	1-740224	8670417	7
115	36 -5592	262 1	788087	8727801	47 34	$13 \cdot 4881136 \cdot 569262 \\ 1 \cdot 788067 \cdot 8727801 \\ 4 \cdot 734 \cdot 4934359 \cdot 567309 \\ 1 \cdot 762705 \cdot 8697821 \\ 2654 \cdot 4984877 \cdot 575025 \\ 1 \cdot 739053 \cdot 868867 \\ 2 \cdot 736781 \cdot 73868967 \\ 3 \cdot 73868967 \\ 3 \cdot 73868967 \\ 3 \cdot 73868967 \\ 3 \cdot 738688967 \\ 4 \cdot 738688967 \\ 3 \cdot 738688967 \\ 4 \cdot 73868897 \\ 4 \cdot 7386889 \\ 4 \cdot 73868897 \\ 4 \cdot 7386889 \\ 4 \cdot 73868889 \\ 4 \cdot 7386889 \\$.567309	1-762705	8697821	2654	4984877	-575025	1-739053	7968998	9
367	74 -5596	344 1	788847	8726381	46 38	$4.4883674.559644 \\ 1.786847.8726381 \\ 46 \\ 35 \\ 498889.567694 \\ 1.761511 \\ 1.761511 \\ 1.8696386 \\ 25 \\ 55 \\ 5 \\ 14987399.575412 \\ 1.737883 \\ 1.8667517 \\ 1.7861511 \\ 1.8696386 \\ 1.869638 \\$	-567694	1.761511	8696386	25 55	.4987399	.575412	1-737883	8667517	5
621	12 5600	186	785628	8724960	45 36	$5.4886212 \cdot 560026 \cdot 1.785628 \cdot 8724960 \cdot 45 \cdot 36 \cdot 4939419 \cdot 568079 \cdot 1.760318 \cdot 8694949 \cdot 24 \cdot 56 \cdot 4989920 \cdot 575799 \cdot 1.736714 \cdot 8666066 \cdot 24 \cdot 1.060000 \cdot 1.0600000000000000000000000000000000000$.568079	1.760318	8694949	24 56	-4989920	.575799	1.736714	8666066	4
877	50 -5604	1001	784410	8723538	44 37	$6^{1} \cdot 8888750 \cdot 560409 \\ 1\cdot 784410 \cdot 8723538 \\ 44 \\ 37 \cdot 4941948 \cdot 568463 \\ 1\cdot 759126 \cdot 8693512 \\ 2857 \cdot 4992441 \cdot 576187 \\ 1\cdot 735546 \cdot 8664614 \\ 2857 \cdot 4992441 \cdot 576187 \\ 2857 \cdot 48987 \\ 2857 \cdot 48887 \\ 2857 \cdot 4887 \\ 2857 \cdot $	568463	1.759126	-8693512	23 57	4992441	-576187	1.735546	8664614	9
125	88 -5607	791 1	783194	8722116	43 38	$7.4891288 \cdot 560791 \cdot 1.783194 \cdot 8722116 \cdot 43 \cdot 38 \cdot 494476 \cdot 568848 \cdot 1.757936 \cdot 8692074 \cdot 22 \cdot 58 \cdot 4994961 \cdot 576574 \cdot 1.734380 \cdot 8663161 \cdot 1.74891288 \cdot 1.74891288 \cdot 1.74891288 \cdot 1.74891288 \cdot 1.7489128 \cdot 1.7489188 \cdot 1.7489188 \cdot 1.748918 \cdot $	-568848	1-757936	8692074	22 58	-4994961	-576574	1-734380	1916998	CS
388	25 5611	1781	.781979	8720693	42 39	$804893825 \cdot 561173 \cdot 1.781979 \cdot 8720693 \cdot 42 \cdot 2947005 \cdot 569233 \cdot 1.756747 \cdot 8690636 \cdot 2159 \cdot 4997481 \cdot 576962 \cdot 1.733214 \cdot 8661708 \cdot 1.781979 \cdot 1.78199 \cdot 1.78199 \cdot 1.78199 \cdot 1.781979 \cdot 1.78199 \cdot 1.78199 \cdot 1.78199 \cdot 1.78199 \cdot 1.78199 \cdot 1.7819 \cdot 1.7$	-569233	1-756747	9890698	21 59	4997481	-576962	1-733214	8661708	-
636	61 -5615	1 999	-780765	8719269	4140	$194896361 \cdot 561556 \cdot 1.780765 \cdot 8719269 \cdot 41140 \cdot 4949532 \cdot 569619 \cdot 1.755559 \cdot 8689196 \cdot 2060 \cdot 5000000 \cdot 577350 \cdot 1.732050 \cdot 8660254 \cdot 2060000 \cdot 2060000 \cdot 20600000 \cdot 20600000 \cdot 2060000000000$	-569619	1-755559	9616898	20 60	.5000000	-577350	1-732050	8660254	0
888	3199- 26	939 1	.779552	20 4898897 -561939 1-779552 -8717844 40	40										
Cosine.	e. Cotang.		Tang.	Sine.	1	, Cosine.	Cotang.	Tang.	Sine.	1	Cosine. Cotang.	Cotang.	Tang.	Sine.	-

30 Deg.

30 Deg.

1.730897.8658799 | 5922.5055319.585914 | 1.706732.8628079 | 3842.5105429.593756 | 1.684191 | 8598523 | 1.7308776 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.73087756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1.7308756 | 1. $\cdot 5022656 \cdot 580846 \cdot 1 \cdot 721626 \cdot 8647134 \cdot 51 \cdot 30 \cdot 5075384 \cdot 589045 \cdot 1 \cdot 697663 \cdot 8616292 \cdot 30 \cdot 5025656 \cdot 598908 \cdot 1 \cdot 675298 \cdot 8586619 \cdot 1 \cdot 697638 \cdot 8586619 \cdot 1 \cdot 697638 \cdot 8586619 \cdot 1 \cdot 697638 \cdot 1 \cdot 69763$ -678625 8591088 1.707871 -8629549 3941 -5102928 -593363 1-685308 -8600007 1.729726 8657344 5823 5057828 586305 1.705595 8626608 3743 5107930 594150 1.683076 8597037 -676406 -8588109 5724 ·5060338 ·586696 1 · 704458 ·8625137 3644 · 5110431 ·594543 1 ·681962 ·8595551 $\cdot 5027685 \cdot 581624 \cdot 1719322 \cdot 8644211 \cdot 4932 \cdot 5080396 \cdot 589828 \cdot 1695406 \cdot 8613337 \cdot 2852 \cdot 5130420 \cdot 597697 \cdot 1673086 \cdot 8583635 \cdot 168676 \cdot 168$ 53 -5132916 -598092 1-671981 -8582143 Cosine. 1-670878 -8580649 669775 8579155 -668674|-8577660 37 5092918 591791 1-689785 8605939 2357 5142899 599673 1-667574 8576164 ·666474 ·8574668 600860 1.664279 8571673 Sine. Cotang. Tang. -5010073 -578902 1-727406 -8654430 -5682846 -587087 1-703323 -8623654 -3545 -5112931 -594937 1-703323Tang. $1 - 726247 \cdot 8652973 \cdot 5526 \cdot 5065355 \cdot 587478 \cdot 702189 \cdot 8622191 \cdot 3446 \cdot 5115431 \cdot 595331$ 27 5067863 587870 1.701055 8620717 3347 5117930 595725 •6020140 •580457 1-722779 •8648595 5229 •5072877 •58853 1-698792 •8617768 3149 •5122927 •596514 $15 \cdot 5037740 \cdot 583182 \cdot 1 \cdot 714728 \cdot 8638355 \cdot 45 \cdot 36 \cdot 5090414 \cdot 591398 \cdot 1 \cdot 690907 \cdot 8607420 \cdot 24 \cdot 56 \cdot 5140404 \cdot 599278 \cdot 126 \cdot 12$ $3.5032713 \mid 582403 \mid 1.717023 \mid .8641284 \mid 47 \mid 34 \mid .5085406 \mid .590613 \mid 1.693155 \mid .8610380 \mid 26 \mid 54 \mid .5135413 \mid .598487 \mid 1.693155 \mid .8610380 \mid 1.717023 \mid .8610380 \mid .86$ Cosine. Cotang. $\textbf{19.5047788.584743} \ 1 \cdot 710152 \cdot 8632488 \ 41 \ 40 \cdot 5100426 \cdot 592969 \ 1 \cdot 686426 \cdot 8601491 \ 20 \cdot 60 \cdot 5150381 \ 1 \cdot 686426 \cdot 8601491 \ 20 \cdot 60 \cdot 5150381 \ 1 \cdot 686426 \cdot 8601491 \ 20 \cdot 60 \cdot 5150381 \ 1 \cdot 686426 \cdot 686426 \ 1 \cdot 686426$ Sine. Sine. /// 12 5030199 582013 1-718172 8642748 48 33 5082901 590221 1-694280 8611859 27 Cosine. Cotang. Tang. Tang. 1.732050 8660254 6021 5052809 585524 Cosine, |Cotang. Sine. ·725090 -8651514 54 16 5040252 583572 1-713582 8636889 44 20 5050298 585133 1.709011 8631019 40 1.728565 8655887 Cotang. | Cosine. Sine. Tang. -5015107 -579679 1 -5007556 -578514 ·5000000 ·577350 -5012591 -579291 Tang. Cotang. Cosine. Sine.

Deg. 59.

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Sine. Tang. Cotang. Cosine. 5252241 -617210 1-620192 -8609639 1-6254717 -617612 1-619188 -85061111 1-6254717 -617612 1-619188 -85061111 1-625665 -618416 1-61783 -8506582 1-6254613 -618928 1-618928 -8506459 1-6264613 -619922 11-614932 -85061991 1-5267085 -619623 1-612384 -8498927 1-526958 -620026 1-612334 -8498927 1-526973 -62022 1-610741 -6498680 1-5279443 -621235 1-609696 -8494325 5279443 -621235 1-609696 -8498179 -6228653 -622852 -6488179 -622865 1-60526 -8488179 -622865 1-60526 -8488179 -622865 1-602485 -848664 1-5298726 -623656 1-602408 -848562 -5286726 -624465 1-602408 -848562 -5289428 -622465 1-602408 -848562 -5289428 -622465 1-60234 -8480481 -602365 -624465 1-60234 -8480481 -62299193 -624869 1-600334 -8480481	T` %	Sine. /	Tang.	Cotang	Cosine.	_!!	T	Sine. // / / Deg. 58.	<u> </u>	Tang. Sine. // / Deg. 58.	Cotang. Tang. Sine. ',' ' Deg. 58.	Cosine Cotang. Tang. Sine. '/' Deg. 58.	, 58 Deg. 58.	Cotang. Tang. Sine. ',' ' Deg. 58.	Cosine Cotang. Tang. Sine. ///	Sine.
Sine, Tang, Cotang, Cosim, 13941 -5252241 -617210 1-620192 -650966 3842 -5254717 -617612 1-619138 -65081 37443 -5257191 -618014 1-618085 -86068 3844 -52567191 -618014 1-618085 -86068 -61844 -5256239 -618416 1-617033 -86050 23545 -526413 -61821 1-613882 -86019 -61346 -5264613 -619221 1-613882 -86019 -61346 -5264613 -619221 1-613882 -86094 -61346 -526086 -626085	=	848048	1-600334	624869	.5299193	2060		8511167	1.621246 8511167	.616809 1.621246 .8511167	5249766 -616809 1-621246 -8511167	40 5249766 616809 1.621246 8511167	7 4140 5249766 616809 1.621246 8511167 4 40	-8543077 4140 -5249766 -616809 1 -621246 -8511167 -8541564 40	1-643633 -8543077 4140 -5249766 -616809 1-621246 -8511167 1-642557 -8541564 40	$ \begin{array}{c} \textbf{19} \cdot \textbf{5197676} \cdot \textbf{608408} & \textbf{1\cdot643633} \cdot \textbf{8543077} \textbf{4140} \cdot \textbf{5249766} \cdot \textbf{616809} & \textbf{1\cdot621246} \cdot \textbf{8511167} \textbf{20} \textbf{60} \cdot \textbf{5299193} \cdot \textbf{624869} & \textbf{1\cdot600334} \cdot \textbf{8480481} \\ \textbf{20} \cdot \textbf{5200161} \cdot \textbf{608806} & \textbf{1\cdot642557} \cdot \textbf{8541564} & \textbf{40} \\ \end{array} $
ne. / / Sine. Tang. Cotang. Cosine. 15528241		8482022	1-601370	624465	-5296726	2159	93	85126	1-622302 85126	$\cdot 616407 1 \cdot 622302 \cdot 85126$	$\cdot 5247290 \cdot 616407 1 \cdot 622302 \cdot 85126$	$39 \cdot 5247290 \cdot 616407 \cdot 1 \cdot 622302 \cdot 85126$	88 42 39 5247290 616407 1.622302 85126	8544588 42 39 5247290 616407 1.622302 85126	$1.644711 \cdot 8544588 42 39 \cdot 5247290 \cdot 616407 1 \cdot 622302 \cdot 85126$	$18^{\circ}5195191^{\circ}608009 1\cdot644711^{\circ}854458 42 39^{\circ}5247290^{\circ}616407 1\cdot622302^{\circ}8512693^{\circ}159^{\circ}5296726^{\circ}624455 1\cdot601370^{\circ}8482022^{\circ}888202^{\circ}888$
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osine. / Sine. Tang. Cotang. Cosine. 40051 3941 -525241 -617210 1-620192 -8609639 138538 3842 -5254717 -617612 1-619138 -8509139 1337023 3743 -5257191 -618014 1-618085 -8506582 135568 3644 -52567191 -618014 1-618085 -8506582 135392 3546 -5262139 -618818 1-615982 -8506582 13240 3244 -5257085 -618818 1-615982 -8500459 130958 3347 -5267085 -619221 1-614932 -8500459 13240 3248 -526958 -620026 1-612834 -8498927 1349 -527921 3149 -5277085 -6180832 1-610741 -8495860 12481 2951 -5279443 -621638 1-6066567 -8492790 21839 2753 -52819 14 -622041 1-607609 -8491254 20381 2555 -528948 -6228248 1-605526 -8488179 14789 -8492790 21839 2755 -528938 -6228248 1-605526 -8488179 14789 -8488179 -62178 -6228248 1-605526 -8488179 -6228932 -6228248 1-604486 -848864179 -6228932 -6228252 1-604486 -848864179 -6228932 -6228252 1-604486 -848864179 -6228932 -6228252 1-604486 -848864179 -622828 -6228252 1-604486 -848864179 -622826 -622825 1-604486 -848864179 -622828 1-604486 -848864179 -622828 1-604486 -848864179 -622828 1-604486 -848864179 -622828 1-604486 -848864179 -622828 1-604486 -848864 -622828 1-604486 -848864 -622828 1-604486 -848864 -622828 1-604486 -848864 -622828 1-604486 -848864 -622828 1-604486 -84886 -622828 1-604486 -848864 -622828 1-604486 -84886 -622828 1-604		8485102	1-603446	623656	.5291790	2357	15745	.85	1-6244171-85	·615605 1·624417 ·85	-5242336 -615605 1-624417 85	37 5242336 615605 1.624417 85	19 44 37 5242336 615605 1.624417 85	8547609 44 37 5242336 615605 1 624417 85	1.646868 8547609 44 37 5242336 615605 1.624417 85	$16 \cdot 5190219 \cdot 607213 \cdot 646868 \cdot 8547609 \cdot 44 \cdot 37 \cdot 5242336 \cdot 615605 \cdot 1624417 \cdot 8515745 \cdot 2357 \cdot 5291790 \cdot 623656 \cdot 1603446 \cdot 8485102 \cdot 1629103 \cdot 16291000 \cdot 162910000 \cdot 1629100000 \cdot 162910000 \cdot 162910000 \cdot 162910000 \cdot 162910000 \cdot 162910000000$
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Cosine. Sine. Tang. Cotang. Cosine. Sine. Tang. Cotang. Cosine. Sine. Tang. Cotang. Cosine. Sine. State September	4.,	8488179	1-605526	622848	.5286853	2555	518793	·αρ	1-626536 8	·614803 1·626536 ·8	·5237381 ·614803 1·626536 ·8	35 5237381 614803 1.626536 8	27 46 38 5237381 614803 1.626536 8	8550627 46 35 5237381 614803 1.626536 8	1.649030 .8550627 46 35 .5237381 .614803 1.626536 .8	$(4.5185246.606417 1.649030 \cdot 8550627 46 35 \cdot 5237381 \cdot 614803 1 \cdot 626536 \cdot 8518793 25 5586853 \cdot 628686 362828 1 \cdot 605526 \cdot 8488179 3628246 1 \cdot 606417 1 \cdot 649030 \cdot 866868 1 \cdot 606526 \cdot 8488179 1 \cdot 64968 1 \cdot$
Cosine. / Sine. Tang. Cotang. Cosine. Sine. Tang. Cotang. Cosine. S540051 3941 -5252241 -617210 1-620192 -8609639 1853628 2842 -5254717 -617612 1-619138 -8508111 18537023 3743 -5257191 -618014 1-618085 -8506682 18538508 3644 -5259665 -618416 1-617033 -8505083 1853892 2645 -5282139 618018 1-61892 -8505083 1853844 1853844 1853844 1853844 1853844 1853844 1853844 1853844 1853844 1853844 1853848 - 18509489 1853848 1853848 - 18509489 1853848 - 185394 1853848 - 185394 1853848 - 185394 1853848 185384 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 1853848 185384 1853848	_	8489717	1-606567	622445	5284383	2654	3520316	÷	1.627597	614402 1.627597	·5234903 ·614402 1·627597 ·6	34 5234903 614402 1.627597	35 47 34 5234903 614402 1.627597 6	8552135 47 34 5234903 614402 1.627597 6	1.650112 .8552135 47 34 .5234903 .614402 1.627597 .6	$ (3 \cdot 5182758 \cdot 606019 \cdot 1 \cdot 650112 \cdot 3552135 \cdot 47 \cdot 34 \cdot 5234903 \cdot 614402 \cdot 1 \cdot 627597 \cdot 8520316 \cdot 264 \cdot 5284383 \cdot 622445 \cdot 1 \cdot 606567 \cdot 9489717 \cdot 1 $
Cosine. / Sine. Tang. Cotang. Cosine. Sine. Sine. Tang. Cotang. Cosine. 1540051 3941 - 5252241 -617210 1-620192 -8509639 1 5537023 3743 - 5257191 -618014 1-618085 -8506682 5533902 3545 - 5262198 -618014 1-618085 -8506682 5533902 3544 - 5259665 -618014 1-618085 -8505682 5533902 3547 -5446 -526218 -618018 1-61808 -8605682 5539947 -526218 -618021 1-614932 -8601991 -6209440 -620946 -618082 -618082 -61904 -6209440 -620968 -620026 -612394 -649927 -620968 -620928 -6209		8491254	609409-1	622041	5281914	2753	8521836	•	1-628659	614001 1.628659	-5232424 -614001 1-628659	33 5232424 614001 1.628659	43 48 33 -5232424 -614001 1-628659 -	8553643 48 33 5232424 614001 1 628659	1.651196 8553643 48 33 5232424 614001 1.628659	$12.5180270 \cdot 605621 \cdot 1.651196 \cdot 8553643 \cdot 4933 \cdot 5232424 \cdot 614001 \cdot 1.628659 \cdot 8521839 \cdot 2753 \cdot 5281914 \cdot 622041 \cdot 1.607609 \cdot 8491254 \cdot 1.628659 \cdot 1.62$
Cosine. / Sine. Tang. Cotang. Cosine. Sine. Tang. Cotang. Cosine. Sine. Sine. Tang. Cotang. Cosine. S540051 3941 -5252241 -617210 1-620192 -8509639 1 -62524717 -617612 1-619138 -8508111 -613902 -6160811 1-618085 -8506682 -625568 -6144 -525666 -614816 1-615982 -8506682 -625568 -62568 -6256	~	8492790	1.608652	-621638	.5279443	2852	8523360		1-629722	613601 1.629722	5229945 613601 1.629722	32 5229945 613601 1.629722	49 49 32 5229945 613601 1.629722	8555149 49 32 5229945 613601 1.629722	1.652280 8555149 49 32 5229945 613601 1.629722	$\cdot 5177782 \cdot 605224 \cdot 1 \cdot 652280 \cdot 8596149 \cdot 8932 \cdot 5229945 \cdot 613601 \cdot 629722 \cdot 8523360 \cdot 2852 \cdot 5279443 \cdot 621638 \cdot 1 \cdot 608652 \cdot 8492790 \cdot 1 \cdot 608652 \cdot 608662 \cdot 608$
Cosine / Sine. Tang. Cotang. Cosine. 15440051 3941 -5252241 -617210 1-620192 -8509591 155350838538 3842 -5254717 -617612 1-619138 -8508111 15537023 3743 -5257 911-61 8014 11-611938 -85056821 1553992 3545 -5262139 -618818 1-615982 -850552 1553992 3545 -5262139 -618818 1-615982 -850552 15539475 3446 -526461 3-618818 1-615982 -8509459 1553944 -9498927 1149 -5272030 -620429 1-611787 -949927 1552792 1349 -5272030 -620429 1-611787 -949927 1552792 1349 -5272030 -620429 1-611787 -949927 15526402 3050 -5274502 -520832 1-610741 -9496860 1	•	8494325	1.609696	621235	-5276973	2951	852488		1-630786	613201 1.630786	5227466 613201 1.630786	31 5227466 613201 1.630786	55 50 31 5227466 613201 1.630786	8556655 50 31 5227466 613201 1.630786	$1.653366 \cdot 8556655 50 31 \cdot 5227466 \cdot 613201 1.630786 $	$0.5175293 \cdot 604826 \cdot 1.653366 \cdot 8556655 \cdot 50 \cdot 31 \cdot 5227466 \cdot 613201 \cdot 1.630786 \cdot 8524881 \cdot 29 \cdot 51 \cdot 5276973 \cdot 621235 \cdot 1.609696 \cdot 8494325 \cdot 1.609696 \cdot 816000000000000000000000000000000000000$
Cosine. / Sine. Tang. Cotang. Cosine. 1540051 3941 -5252241 -617210 1-620192 -8609639 1 -62527023 3743 -5257191 -618014 1-619085 -86066821	_	8495860	1.610741	620832	-5274502	3050	852640		1-631851	-612800 1-631851	5224986 612800 1.631851	30-5224986 -612800 1-631851	60 51 30 5224986 612800 1.631851	8558160 51 30 5224986 612800 1.631851	1.654452 8558160 51 30 5224986 612800 1.631851	$\cdot 5172804 \cdot 604429 \cdot 1 \cdot 654452 \cdot 8558160 \cdot 5130 \cdot 5224986 \cdot 612800 \cdot 631851 \cdot 8526402 \cdot 3050 \cdot 5274502 \cdot 620832 \cdot 1 \cdot 610741 \cdot 8495860 \cdot 5172804 \cdot 6004429 \cdot 620832 \cdot 610741 \cdot 6495860 \cdot 649560 \cdot 64960 \cdot 649560 \cdot 649560 \cdot 649560 \cdot 649560 \cdot 649560 \cdot 649560 \cdot 64956$
Cosine. / Sine. Tang. Cotang. Cosine. 5440051 3941 -5252241 -617210 1-620192 -8609639 1 5537023 3742 -5254717 -617612 1-619138 -8508111 15537023 3743 -525719 1-618014 1-619085 -85066821 15537023 3744 -5259665 -618416 1-617033 -8505083 1553992 3546 -5264513 -618018 1-615982 -8505083 15539940 33446 -5264613 -619221 1-614932 -8501991 15539440 3248 -5267085 -619623 1-612334 -849932 -8501991 15539440 3248 -526958 -850026 1-612334 -849932 -8500469 1	_	8497394	1-611787	620429	.5272030	3149	852792		1-632917	-612400 1-632917	5222505 612400 1-632917	29 5222505 612400 1-632917	64 52 29 5222505 612400 1.632917	8559664 52 29 5222505 612400 1-632917	$1.655540 \cdot 8559664 \cdot 5222505 \cdot 612400 \cdot 632917$	$8 \cdot 5170314 \cdot 604032 \cdot 1 \cdot 655540 \cdot 8559664 \cdot 8559664 \cdot 522505 \cdot 612400 \cdot 1 \cdot 622917 \cdot 8627921 \cdot 3149 \cdot 5272030 \cdot 620429 \cdot 1 \cdot 611787 \cdot 8497394 \cdot 11$
Cosine. / Sine. Tang. Cotang. Cosine. 5540051 3941 -5252241 -617210 1-620192 -8609639 135520283 3342 -5254717 -617612 11619138 -850911 15537023 3743 -5257191 -618014 1-618095 -8606682 1553508 3644 -5259665 -618416 1-61703 -8605682 1553992 3545 -5262139 -618618 11615982 -8603922 155393476 3446 -5264613 -61923 11-614932 -8601991 15530958 3347 -5267085 -619623 1-619382 -85004691	=	8498927	1-612834	-620026	5269558	3248	852944		1-633984	·612000 1·633984	5220024 612000 1.633984	328.5220024.6120001.633984	$68 53 28 \cdot 5220024 \cdot 612000 1\cdot 633984$	$ \cdot 8561168 53 28 \cdot 5220024 \cdot 612000 1 \cdot 633984$	$1.656629 \cdot 8561168 \cdot 5328 \cdot 5220024 \cdot 612000 \cdot 1.633984$	$ \cdot 5167824 \cdot 603635 1 \cdot 656629 \cdot 8561168 \cdot 5328 \cdot 6220024 \cdot 612000 \cdot 1 \cdot 633984 \cdot 8529440 \cdot 3248 \cdot 5269558 \cdot 620026 \cdot 1 \cdot 612834 \cdot 8498927 \cdot 1288 $
Cosine. / / Sine. Tang. Cotang. Cosine. Sine. Tang. Cotang. Cosine. S5436051 S642051 S653608 S6448 S657191 G1620192 S6506821 S653992 S654682 S656083694 S656083694 S656083692 S656083692 S656083692 S66692 S656083692 S66692 S6692 S6	==	8500459	1.613882	-619623	5267085	33347	8530958		1-635052	-611601 1-635052	5217543 611601 1.635052	127 5217543 611601 1-635052	71 54 27 5217543 611601 1.635052	8562671 54 27 5217543 611601 1-635052	1.657718 8562671 54 27 5217543 611601 1.635052	$\cdot 5165333 \cdot 603238 \cdot 1657718 \cdot 8562671 \cdot 5217543 \cdot 611601 \cdot 1635052 \cdot 8530958 \cdot 3347 \cdot 5267085 \cdot 619623 \cdot 1613882 \cdot 8500459 \cdot 186773 \cdot 1867718 \cdot$
Cosine. / / Sine. Tang. Cotang. Cosine. 5540051 3941 -5252241 -617210 1-620192 -8509539 1 5537023 3743 -5257191 -618018 1-61938 -8506582 553992 3545 -5259665 -618818 1-61998 -5605083	Ξ	8501991	1.614932	619221	5264613	5 34 46	853247		1.636121	-611201 1-636121	5215061 -611201 1-636121	5 26 5215061 611201 1.636121	73 55 26 5215061 611201 1.636121	8564173 55 26 5215061 611201 1.636121	1.658809 8564173 55 26 5215061 611201 1.636121	$ \cdot 5162842 \cdot 602841 \cdot 658809 \cdot 8564173 \cdot 55 \cdot 251506 \cdot 621506 \cdot 611201 \cdot 636121 \cdot 8532475 \cdot 3446 \cdot 5264613 \cdot 61922 \cdot 1 \cdot 614932 \cdot 8601991 \cdot 6162847 \cdot 6162$
Cosine. / Sine. Tang. Cotang. Cosine. 55440051 3941 -5252241 -617210 1-620192 -86096391 18537023 3743 -5257191 -618014 11618085 -86066651 8535508 3644 -5259665 -618416 1-617033 -860505831	12	8503522	1.615982	•618818	5262139	2 35 45	-853399		1-637191	1610801 1.637191	-5212579 .610801 1-637191	6 25 5212579 610801 1.637191	74 56 25 5212579 610801 1.637191	8565674 56 25 5212579 610801 1.637191	$ 1.659901 \cdot 8565674 56 25 \cdot 5212579 \cdot 610801 1 \cdot 637191 $	$\cdot 5160351 \cdot 602445 \cdot 1 \cdot 659901 \cdot 8565674 \cdot 56 \cdot 25 \cdot 5212579 \cdot 610801 \cdot 1 \cdot 637191 \cdot 8533992 \cdot 3545 \cdot 5262139 \cdot 618818 \cdot 1 \cdot 615982 \cdot 8603522 \cdot 15 \cdot 15 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$
Cosine. / Sine. Tang. Cotang. Cosine. 5440051 3941 -5252241 -617210 1-620192 -8609639 1 55254717 -617612 1-619138 -850811 1 5537023 3743 -5257191 -618014 11-618085 -8606682	16	8505053	1.617033	618416	- 5259665	3/3644	853550		1.638263	-610402 1-638263	-5210096 -610402 1-638263	724 5210096 610402 1.638263	75 57 24 5210096 610402 1.638263	8567175 57 24 5210096 610402 1.638263	1.660994 8567175 5724 5210096 610402 1.638263	$\cdot 5157859 \cdot 602049 \mid 1 \cdot 660994 \mid \cdot 8567175 \mid 57/24 \mid \cdot 5210096 \mid \cdot 610402 \mid 1 \cdot 638263 \mid \cdot 8535508 \mid 36/44 \mid \cdot 5259665 \mid \cdot 618416 \mid 1 \cdot 617033 \mid \cdot 86505053 \mid 16/2416 \mid 1 \cdot 617033 \mid \cdot 8605053 \mid 16/2416 \mid 1 \cdot 617033 \mid \cdot 8605053 \mid 16/2416 \mid 1 \cdot 617033 \mid \cdot 8605053 \mid 16/2416 \mid 1 \cdot 617033 \mid \cdot 8605053 \mid 16/2416 \mid 1 \cdot 617033 \mid \cdot 8605053 \mid 16/2416 \mid 1 \cdot 617033 \mid \cdot 8605053 \mid 16/2416 \mid 1 \cdot 617033 \mid \cdot 8605053 \mid 16/2416 \mid 1 \cdot 617033 \mid 1 \cdot 61703$
Cosine. ' ' Sine. Tang. Cotang. Cosine. 5540051 3941 -5252241 -617210 1-620192 -8609639 5588538 3842 -5254717 -617612 1-619138 -8508111	17	8506582	1.618085	-618014	1-5257191	33743	853702	<u> </u>	1-639335	-610003 1-639335	5207613 610003 1.639335	823 5207613 610003 1.639335	75 58 23 5207613 610003 1.639335	8568675 58 23 5207613 610003 1.639335	1.662088 8568675 58 23 5207613 610003 1.639335	$2 \cdot 5155367 \cdot 601652 \cdot 1 \cdot 662088 \cdot 8568675 \cdot 5823 \cdot 5207613 \cdot 610003 \cdot 1 \cdot 639335 \cdot 8537023 \cdot 3743 \cdot 5257191 \cdot 618014 \cdot 1 \cdot 618085 \cdot 8506582 \cdot 1778 \cdot 178888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 1188888 \cdot 118888 \cdot 118888 \cdot 1$
Cosine. ' ' Sine. Tang. Cotang. Cosine. S5620051 S941 -5252241 -617210 1-620192 -8609639	18	8508111	1.619138	-617612	5254717	3 38 42	853853	•	1.640408	-609604 1-640408	5205130 609604 1-640408	922 5205130 609604 1.640408	74 59 22 5205130 609604 1.640408	-8570174 59 22 -5205130 -609604 1-640408 -	1.663183 8570174 59 22 5205130 609604 1.640408	$\cdot 5152874 \cdot 601256 \cdot 1 \cdot 603183 \cdot 8570174 \cdot 5922 \cdot 5205130 \cdot 609604 \cdot 1 \cdot 640408 \cdot 8538538 \cdot 3842 \cdot 5254717 \cdot 617612 \cdot 1 \cdot 619138 \cdot 8508111 \cdot 188 \cdot 1 \cdot 188 \cdot 18$
' ' Sine. Tang. Cotang.	==	8509639	1.620192	-617210	-5252241	1 39 41	354005	ري	1.641482	-609205 1-641482 -	·5202646 ·609205 1·641482 ·5	021 -5202646 -609205 1-641482 -5	73 60 21 -5202646 -609205 1-641482 -5	8571673 60 21 5202646 609205 1.641482	1.664279 -8571673 60 21 -5202646 -609205 1.641482 -	0.5150381.600860 1.664279.8571673 6021.5202646.609205 1.641482.8540051 3941.5252241.617210 1.620192.8569639 19
	_	Cosine.	Cotang.	Tang.	Sine.	, ,	Cosine.	l	Cotang.	l	Cotang.	Tang. Cotang.	'I' Sine. Tang. Cotang.	Cosine. ' Sine. Tang. Cotang.	Cotang. Cosine. 'I' Sine. Tang. Cotang.	Cosine. ' Sine. Tang. Cotang.

Deg. 57.

Deg. 57.

. Deg. 57.

NATURAL SINES AND TANGENTS TO A RADIUS 1. . 32 Deg. 32 Deg.

ä	32 Deg.					32 Deg.			•			· 32 Deg.				
	Sine.	Tang.	Cotang.	Cosine.	Ι,	-	Sine.	Tang.	Cotang.	Cosine.	, ,	Sine.	Tang.	Cotang.	Cosine.	,
	0 -5299193	624869	1-600334	8480481	605	12	350898	633335	1-578791	-8447952	3941	-5399955	-641577	1-558657	-5299193 -624869 1-600334 -8450481 6021 -5350898 -633395 1-578791 -8447952 3941 -5399955 -641577 1-558657 -8416679	19
	1 -5301659	625273	$6301659 \cdot 625273 \cdot 1 \cdot 699299 \cdot 8478939 \cdot 6922 \cdot 5353355 \cdot 633803 \cdot 57776 \cdot 8446395 \cdot 3842 \cdot 5402403 \cdot 641988 \cdot 1 \cdot 557660 \cdot 8415108 \cdot 1 \cdot $	8478939	592	25	353355	633803	1-577776	-8446395	38 42	5402403	641988	1.557660	8415108	18
-	2 5304125	625678	1.598264	8477397	582	3 .5	355812	634211	1-576761	8444838	37 43	5404851	-642399	1-556663	$\cdot 5304125 \cdot 625678 \cdot 1 \cdot 598264 \cdot 8477397 \cdot 15823 \cdot 5355812 \cdot 634211 \cdot 576761 \cdot 8444838 \cdot 3743 \cdot 5404851 \cdot 642399 \cdot 1 \cdot 556663 \cdot 8413536 \cdot 1 \cdot 10000000000000000000000000000000$	17
15	3 -5306591	.626083	$-5306591 \cdot 6260831 \cdot 597231 \cdot 8475853 \cdot 5724 \cdot 5358268 \cdot 634619 \cdot 575747 \cdot 8443279 \cdot 3644 \cdot 5407298 \cdot 642810 \cdot 1.555668 \cdot 8411963 \cdot 54668 \cdot 64668 \cdot $	8475853	572	4 .5	358268	634619	1-575747	8443279	3644	-5407298	642810	1-555668	8411963	16
-	4 -5309057	-626488	1.596198	8474309	562	5 5	360724	635027	1-574735	8441720	35 45	-5409745	.643221	1-554674	$\cdot 5399057 \cdot 6264881 \cdot 596198 \cdot 8474309 \cdot 5635 \cdot 5360724 \cdot 635027 \cdot 1 \cdot 574735 \cdot 8441720 \cdot 3545 \cdot 5409745 \cdot 64322 \cdot 1 \cdot 554674 \cdot 8410390 \cdot 156467 \cdot 106467 $	15
-	5 5311521	626893	1-595167	8472765	552	6.5	863179	635435	1.573723	8440161	34 46	.5412191	-643632	1.553680	$\cdot 62311521 \cdot 626893 \cdot 1 \cdot 595167 \cdot 8472765 \cdot 5526 \cdot 5563179 \cdot 635435 \cdot 1 \cdot 573723 \cdot 8440161 \cdot 3446 \cdot 5412191 \cdot 643632 \cdot 1 \cdot 553680 \cdot 8408816 \cdot 643632 \cdot 1 \cdot 643$	14
_	6 -5313986	-627298	$\cdot 5313986 \cdot 627298 \cdot 1 \cdot 594136 \cdot 8471219 \cdot 5472712 \cdot 5365634 \cdot 635844 \cdot 1 \cdot 572712 \cdot 8438600 \cdot 3347 \cdot 5414637 \cdot 644044 \cdot 1 \cdot 552688 \cdot 8407241 \cdot 5414637 \cdot 541467 \cdot 54$	8471219	542	7.5	365634	635844	1.572712	.8438600	33 47	-5414637	644044	1.552688	8407241	13
-	7 -5316450	627704	1.593107	8469673	532	8 .5	680898	636252	1-571702	.8437039	32 48	5417082	644456	1.551696	$\cdot 5316450 \cdot 627704 \cdot 1 \cdot 593107 \cdot 8469673 \cdot 5328 \cdot 5368089 \cdot 636552 \cdot 1 \cdot 571702 \cdot 8437039 \cdot 3248 \cdot 5417082 \cdot 644456 \cdot 1 \cdot 551696 \cdot 8405666 \cdot 12 \cdot$	12
-	8 -5318913	-628109	1.592078	8468126	522	9 .5	370543	636661	1.570693	8435477	31 49	5419527	-644867	1.550705	$ \cdot 5318913 \cdot 628109 \cdot 1 \cdot 592078 \cdot 8468126 \cdot 6229 \cdot 5370543 \cdot 636661 \cdot 1 \cdot 570693 \cdot 8435477 \cdot 3149 \cdot 5419527 \cdot 644867 \cdot 1 \cdot 550705 \cdot 8404090 \cdot 1 \cdot $	11
	9-5321376	628515	$\cdot 5221376 \cdot 628515 \cdot 1.591050 \cdot 8466579 \cdot 5130 \cdot 5372996 \cdot 637070 \cdot 1.569685 \cdot 8433914 \cdot 3050 \cdot 542197 \cdot 645279 \cdot 1.549715 \cdot 8402513 \cdot 1.546579 \cdot 1.54679 \cdot 1.5$	8466579	513	0 .5	372996	637070	1-569685	8433914	30 50	5421971	•645279	1.549715	8402513	10
-	0 -5323839	.628921	$\cdot 5323339 \cdot 628921 \cdot 1 \cdot 590023 \cdot 8465030 \cdot 5031 \cdot 5375449 \cdot 637479 \cdot 1 \cdot 568678 \cdot 8432351 \cdot 2951 \cdot 5424415 \cdot 645691 \cdot 1 \cdot 548726 \cdot 8400936 \cdot 1 \cdot 5424415 \cdot 645691 \cdot 5424415 \cdot 645691 \cdot 542426 \cdot 8400936 \cdot 1 \cdot 542426 \cdot 1 \cdot 5424415 \cdot 645691 \cdot 5424415 \cdot 642691 \cdot 542441 \cdot 642691 \cdot $	8465030	503	11 .5	375449	637479	1.568678	8432351	2951	-5424415	-645691	1.548726	8400936	6
-	1 -5326301	-629327	$\cdot 5326301 \cdot 629327 \cdot 1.588997 \cdot 8463481 \cdot 49 \cdot 32 \cdot 5377902 \cdot 637888 \cdot 1.567672 \cdot 8430787 \cdot 28 \cdot 52.5426859 \cdot 646104 \cdot 1.547738 \cdot 8399357 \cdot 1.5426859 \cdot 1.5426859 \cdot 1.5427788 \cdot 1.542788 \cdot 1.54278 \cdot 1.5427$	8463481	493	2.5	206778	637888	1-567672	8430787	28 52	.5426859	646104	1.547738	8399357	00
-	2 -5328763	629733	$\cdot 5328763 \cdot 629733 \cdot 1 \cdot 587973 \cdot 3461932 \cdot 48833 \cdot 5380354 \cdot 638297 \cdot 1 \cdot 566666 \cdot 8429222 \cdot 2763 \cdot 5429302 \cdot 646516 \cdot 1 \cdot 546751 \cdot 8397778$	8461932	483	3 -55	80354	638297	1.566666	8429222	27 53	-5429302	-646516	1.546751	8397778	7
-	3 -5331224	681089	$\cdot 5331224 \cdot 630139 \cdot 1 \cdot 586949 \cdot 8460381 \cdot 47 \cdot 34 \cdot 5382806 \cdot 638707 \cdot 1 \cdot 565662 \cdot 8427657 \cdot 2654 \cdot 5431744 \cdot 646929 \cdot 1 \cdot 545764 \cdot 8396199 \cdot 1 \cdot 565667 \cdot 1 \cdot 56567 \cdot 1 \cdot 5657 \cdot 1 \cdot$	8460381	473	4 55	82806	638707	1.565662	8427657	26 54	5431744	646929	1.545764	8396199	9
-	4 -5333685	630546	$\cdot 5333685 \cdot 630546 \cdot 1 \cdot 585926 \cdot 8458830 \cdot 46 \cdot 35 \cdot 5385257 \cdot 639116 \cdot 1 \cdot 564659 \cdot 8426091 \cdot 25 \cdot 55 \cdot 5434187 \cdot 647341 \cdot 1 \cdot 544779 \cdot 8394618 \cdot 1 \cdot 564579 \cdot 1 \cdot $	8458830	463	5 5	85257	639116	1-564659	8426091	25 55	5434187	-647341	1.544779	8394618	10
Did	5 5336145	-630953	$\cdot 5336145 \cdot 630953 \cdot 1 \cdot 584904 \cdot 8457278 \cdot 4518278 \cdot 45186 \cdot 5387708 \cdot 639526 \cdot 1 \cdot 563656 \cdot 8424524 \cdot 2456 \cdot 5436628 \cdot 647754 \cdot 1 \cdot 543794 \cdot 8393037 \cdot 1 \cdot $	8457278	453	9:55	877708	639526	1.563656	8424524	24 56	.5436628	-647754	1.543794	8393037	4
	$[6.5338605.631359] \cdot 5533883 \cdot 8455726 \\ 44437 \cdot 5390158 \cdot 639936 \\ 1 \cdot 562654 \cdot 8422956 \\ 12 \cdot 5439059 \cdot 649167 \\ 1 \cdot 5439059 \cdot 8391455 \\ 1 \cdot 562654 \cdot 8422956 \\ 1 \cdot 562654 \cdot 84229 \\$	-631359	1.583883	8455726	443	7 .5	890158	639936	1-562654	8422956	23 57	.5439069	648167	1.542810	8391455	3
1-1-7	$: 7 : 5341065 : 631766 \mid 1 \cdot 582862 \mid 8454172 \mid 43 \mid 38 \mid 5592608 \cdot 640346 \mid 1 \cdot 561654 \mid 8421388 \mid 22 \mid 58 \mid 5441510 \mid 648580 \mid 1 \cdot 541828 \mid 8889873 \mid 2 \mid $	-631766	1.582862	8454172	433	8 .53	80926	640346	1.561654	8421388	22 58	.5441510	648580	1.541828	8389873	64
-	$(8) \cdot 5343523 \cdot 632173 \cdot 1 \cdot 581843 \cdot 8452618 \cdot 4239 \cdot 5395058 \cdot 640756 \cdot 1 \cdot 560654 \cdot 8419819 \cdot 21 \cdot 59 \cdot 5443951 \cdot 648994 \cdot 1 \cdot 540846 \cdot 8388290 \cdot 1 \cdot $.632173	1.581843	8452618	423	9 -53	195058	640756	1.560654	8419819	21 59	-5443951	.648994	1.540846	.8388290	-
0	$ \begin{array}{c} \textbf{E9.5345982 \cdot 632581} & \textbf{1.580825 \cdot 8451064} & \textbf{41} & \textbf{40} \cdot \textbf{5397507} & \textbf{641} & \textbf{11.559655} & \textbf{8418249} & \textbf{20} & \textbf{60} \cdot \textbf{5446390} & \textbf{649407} & \textbf{11.539865} & \textbf{8388706} \\ \textbf{29.5345982 \cdot 632581} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & \textbf{29.60} \\ \textbf{29.60} & \textbf{29.60} & \textbf{29.60} & 2$.632581	1.580825	8451064	4114	0.55	97507	641167	1-559655	8418249	20 60	-5446390	-649407	1-539865	8386706	0
(a)(Y	20 -5348440 -632988 1-579807 -8449508 40	886229	1.579807	8449508	40											
	Cosine.	Cotang.	Tang.	Sine.	`	0/	osine.	/ Cosine, Cotang.	Tang.	Sine.	1/	/ Cosine. Cotang.	Cotang.	Tang.	Sine.	-

	-	19	18	17	91	15	14	13	53	11	10	6	00	1	9	10	4	es	64	7	0		-	8
	Cosine.	0-5446390 -649407 1-539865 -8386706 6021 -5497520 -658127 1-519463 -8353279 3941 -5546024 -666496 1-500382 -8321155 19	8319541	8317927	-5453707 - 650649 + 536927 - 8381950 + 5724 - 5504807 - 659378 + 516579 - 8348479 + 36 + 4 - 5553283 - 667758 + 497548 - 8316312 + 667376 - 667758 + 66775	$5456145 \cdot 651063 \cdot 1.535949 \cdot 8380363 \cdot 5625 \cdot 5507236 \cdot 659796 \cdot 515620 \cdot 8346877 \cdot 3545 \cdot 555702 \cdot 668178 \cdot 1.496605 \cdot 8314696 \cdot 1.515620 \cdot 8346877 \cdot 3545 \cdot 555702 \cdot 668178 \cdot 1.496605 \cdot 8314696 \cdot 1.515620 \cdot 8346877 \cdot 1.515620 \cdot 1.516200 \cdot 1.515620 \cdot$	8313080	$5461020 \cdot 651891 \cdot 1.533996 \cdot 8377187 \cdot 5427 \cdot 5512091 \cdot 660631 \cdot 513703 \cdot 8343672 \cdot 3347 \cdot 5560539 \cdot 669020 \cdot 1.494722 \cdot 8311463 \cdot 13$	$5463456 \cdot 652306 \mid 1 \cdot 533021 \cdot 8375598 \mid 5328 \mid \cdot 5514518 \cdot 661049 \mid 1 \cdot 512746 \mid \cdot 8312068 \mid 3248 \mid \cdot 5562956 \mid \cdot 669441 \mid 1 \cdot 493782 \mid \cdot 8309845 \mid 123746 \mid \cdot 831661 \mid 123782 \mid \cdot 831681 $	$ \begin{array}{c} 53455892 \cdot 652721 \\ 1 \cdot 532047 \cdot 8374009 \\ 529 \cdot 5516944 \cdot 661467 \\ 1 \cdot 511790 \cdot 8340463 \\ 31 \cdot 49 \cdot 5565373 \cdot 669863 \\ 1 \cdot 492842 \cdot 8308226 \\ 31 \cdot 492842 \cdot 8308226 \\ 32 \cdot 692842 \cdot 8308226 \\ 33 \cdot 692842 \cdot 8308226 \\ 34 \cdot 692842 \cdot 830826 \\ 34 \cdot 692842 \cdot 83082 \\ 34 \cdot 69284 \\ 34 \cdot 6928 $	$-5468328 \cdot 653136 \cdot 1 \cdot 531074 \cdot 6372418 \cdot 5130 \cdot 5519370 \cdot 661885 \cdot 1 \cdot 510835 \cdot 8338858 \cdot 30 \cdot 50 \cdot 5567790 \cdot 670284 \cdot 1 \cdot 491903 \cdot 8306607 \cdot 10 \cdot $	8304987	8303366	8301745	8300123	8298500	8296877	8295252	8293628	8292002	8290376		Sine.	Deg. 56.
	Cotang.	1-500382	$5448830 \cdot 649821 \cdot 1.538884 \cdot 8385121 \cdot 59923 \cdot 5499950 \cdot 658544 \cdot 1.518501 \cdot 8351680 \cdot 3842 \cdot 5548444 \cdot 666917 \cdot 1.499436 \cdot 8319541 \cdot 1.518501 \cdot 1.51850 $	$5451269 \cdot 650235 \cdot 1 \cdot 537905 \cdot 8383536 \cdot 58823 \cdot 5502379 \cdot 658961 \cdot 517540 \cdot 8350080 \cdot 37483 \cdot 5550864 \cdot 667337 \cdot 1 \cdot 498492 \cdot 8317927 \cdot 1 \cdot $	1-497548	1-496605	$5458583 \cdot 651477 \cdot 1 \cdot 534972 \cdot 8378775 \cdot 5526 \cdot 5599663 \cdot 660213 \cdot 514661 \cdot 8345275 \cdot 3446 \cdot 5558121 \cdot 668599 \cdot 495663 \cdot 8313080 \cdot 10 \cdot$	1-494722	1-493782	1-492842	1-491903	$10^{\circ}5470763^{\circ}65351^{\circ}1.530102^{\circ}8370827^{\circ}60^{\circ}31^{\circ}5521795^{\circ}662304^{\circ}1.509880^{\circ}8337252^{\circ}29^{\circ}51^{\circ}570206^{\circ}670706^{\circ}1.499965^{\circ}8304987^{\circ}837252^{\circ}29^{\circ}1.5570206^{\circ}1.499965^{\circ}8304987^{\circ}1.56870706^{\circ}1.499965^{\circ}1.56870706^{\circ}1.499965^{\circ}1.56870706^{\circ}1.499965^{\circ}1.$.1.5473198.6539661.529130.83692364932.5524220.6627221.508927.833564612852.5572621.6711281.490028.8303366	$12.5475632.654381 \\ 1.528160.8367643 \\ 489092.8301745 \\ 1.507974.8334038 \\ 27753.5575036.671550 \\ 1.489092.8301745 \\ 1.507974.8334038 \\ 27753.5575036.671550 \\ 1.489092.8301745 \\ 1.507974.8334038 \\ 27753.5575036.671550 \\ 1.4899032.8301745 \\ 1.507974.8334038 \\ 1.507974.834038 \\ 1.5079$	$13 \cdot 5478066 \cdot 654797 \cdot 1 \cdot 527190 \cdot 8366050 \cdot 4734 \cdot 5529069 \cdot 663560 \cdot 1 \cdot 507022 \cdot 8332430 \cdot 2654 \cdot 5577451 \cdot 671972 \cdot 1 \cdot 488167 \cdot 8300123 \cdot 1 \cdot $	$14.5480499 \cdot 655212 \\ 1 \cdot 526221 \cdot 8364456 \\ 46 \\ 85 \cdot 5531492 \\ \cdot 663979 \\ 1 \cdot 506071 \\ \cdot 8330822 \\ \\ 25 \\ 565979 \\ \cdot 6579865 \\ \cdot 672394 \\ \\ 1 \cdot 48722 \\ \cdot 8298500 \\ \cdot 8298$	$15 \cdot 5482932 \cdot 655628 \\ 1 \cdot 525253 \cdot 635628 \\ 2 \cdot 523262 \cdot 45 \\ 36 \cdot 5533915 \cdot 64398 \\ 1 \cdot 505121 \cdot 8329212 \\ 24 \\ 56 \cdot 5582279 \\ 672816 \\ 1 \cdot 486288 \\ 8296877 \\ 7 \cdot	$16 \cdot 5485365 \cdot 656044 \cdot 1 \cdot 524286 \cdot 8361266 \cdot 44 \cdot 37 \cdot 5236338 \cdot 664817 \cdot 1 \cdot 504171 \cdot 8327602 \cdot 23 \cdot 57 \cdot 5584692 \cdot 673239 \cdot 1 \cdot 485355 \cdot 8295252 \cdot 23 $	$17 \cdot 5487797 \cdot 656460 \cdot 1 \cdot 523320 \cdot 8359670 \cdot 43 \cdot 38 \cdot 5538760 \cdot 665237 \cdot 1 \cdot 503222 \cdot 832599 \cdot 12258 \cdot 5587105 \cdot 673662 \cdot 1 \cdot 484423 \cdot 8293628 \cdot 1 \cdot 5487797 \cdot 1 \cdot 548779 \cdot 1 \cdot$	$18 \cdot 5490228_1656877_1 \cdot 522354_18358074_142\\ 39 \cdot 5541182_1665657_1 \cdot 502275_1834380_21_5995057_1674085_1483491_18292002_18266667_182666666666666666666666666666666666666$	$19.5492659.657293 \\ 1.521389.8356476 \\ 41 \\ 40.5543603.666076 \\ 1.501328.8322768 \\ 20.674208 \\ 1.601328 \\ 1.$		Tang.	
	Tang.	666496	716999	-667337	867758	841899	668899	669020	669441	669863	670284	904049	-671128	.671550	671972	672394	672816	628299	.673662	674085	674508		Cotang.	
	Sine.	5546024	5548444	5550864	5553283	5555702	5558121	5560539	5562956	5565373	5567790	5570206	5572621	5575036	5577451	5579865	5582279	5584692	5587105	5589517	5591929		/ Cosine. Cotang.	
	,1,	39 41	3842	3743	36 14	3545	34 46	33 47	3248	3149	30 50	29 51	28 52	27 53	26 54	25 55	24 56	23 57	22 58	21 59	50 60		1	وو
	Cosine.	8353279	8351680	8350080	8348479	8346877	8345275	8343672	8312068	8340463	8338858	8337252	8335646	8334038	8332430	8330822	8329212	8327602	83525991	8324380	8322768		Sine.	Dec. 56.
	Cotang. Cosine.	1.519463	1.518501	1-517540	1-516579	1.515620	1-514661	1-513703	1.512746	1.511790	1.510835	088609-1	1.508927	1-507974	1.507022	1.506071	1.505121	1.504171	1-503222	1.502275	1.501328		Tang.	
	Tang.	721859	.658544	1968999	-659378	-659796	660213	-660631	-661049	.661467	681885	662304	.662722	663141	-663560	663979	664398	664817	665237	-665657	920999		Cotang.	
	Sine.	5497520	5499950	5502379	5504807	5507236	5509663	5512091	5514518	5516944	5519370	5521795	5524220	5526645	5529069	5531492	5533915	5536338	5538760	5541182	5543603	Ī	/ Cosine. Cotang.	
	,,,	6021	59 22	5823	5724	56 25	55 26	54 27	53 28	52 29	5130	5031	49 32	48 33	4734	4635	45 36	44 37	4338	42 391	4140	40	111	
	Cosine.	8386706	8385121	8383536	8381950	8380363	8378775	8377187	8375598	8374009	8372418	8370827	8369236	8367643	8366050	8364456	8362862	8361266	8359670	8358074	8356476	20 -5495090 -657710 1-520426 -8354878 40	Sine.	Deg. 56.
	Tang. Cotang.	1-539865	1.538884	1-537905	1-536927	1-535949	1-534972	1.533996	1-533021	1-532047	1.531074	1.530102	1.529130	1.528160	1.527190	1.526221	1-525253	1-524286	1-523320	1.522354	1-521389	1.520426	Tang.	
	Tang.	649407	649821	.650235	620649	621063	651477	168159	.652306	652721	653136	-653551	996869	654381	654797	655212	-655628	-656044	.656460	-656877	-657293	657710	Cotang.	
	Sine.	5446390	5448830	5451269	5453707	5456145	5458583	5461020	5463456	5465892	5468328	5470763	5473198	5475632	5478066	5480499	5482932	5485365	5487797	5490228	5492659	5495090	Cosine.	
,	-	0	-	63		+	0	9	-	80		07	11	57	13	14	15	16	17	18	19	20	~	

Deg. 55.

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	Sine.	Tang.	Cotang.	Cosine.	, ,	Sine.	Tang.	Cotang.	Cosine.	,-	Sine.	Tang.	Cotang.	Cosine.	-
0	-5591929	674508	1-482561	8290376	6021	0-5591929 -674508 1-482561 -8290376 6021 -5642467 -683433 1-463200 -8256062 3941 -5690403 -692002 1-445081 -8223096 19	683433	1-463200	8256062	3941	-5690403	-692002	1-445081	8223096	8
-	-5594340	674931	1481631	8288749	59 22	1-481631 -8288749 59 22 -5644869 -683860 1-462287 -8254420 3842 -5692795 -692432 1-444183 -8221440 18	-683860	1-462287	8254420	3842	-5692795	692432	1-444183	8221440	18
04	-5596751	675355	1-480702	8287121	58 23	$6753551 - 480702 \cdot 8287121 \\ \ 56823 \cdot 5647270 \cdot 684287 \\ \ 1 \cdot 461374 \cdot 8252778 \\ \ 3743 \cdot 5695187 \cdot 692863 \\ \ 1 \cdot 443286 \cdot 8219784 \\ \ 17763 \cdot 5695187 \cdot 692863 \\ \ 1 \cdot 443286 \cdot 8219784 \\ \ 17763 \cdot 67535 \\ \ 1 \cdot 480702 \cdot 8897121 \\ \ 1 \cdot 48070$	684287	1-461374	8252778	37 43	-5695187	-692863	1-443286	8219784	2
9	.5599162	-675779	1-479773	8285493	57 24	$\cdot 5599162 \cdot 675779 \cdot 1 \cdot 479773 \cdot 8285493 \cdot 5724 \cdot 5649670 \cdot 684714 \cdot 1 \cdot 460463 \cdot 8251135 \cdot 3644 \cdot 5697577 \cdot 693293 \cdot 1 \cdot 442389 \cdot 8218127 \cdot 1697677 \cdot 693293 \cdot 1 \cdot 442389 \cdot 8218127 \cdot 1697677 \cdot 169767 \cdot $	-684714	1-460463	8251135	3644	-5697577	-693293	1-442389	8218127	16
	-5601572	676202	1-478846	8283864	56 25	$\cdot 5601572 \cdot 676202 \cdot 1 \cdot 478846 \cdot 8283864 \cdot 5626 \cdot 5652070 \cdot 685141 \cdot 1 \cdot 459552 \cdot 8249491 \cdot 3545 \cdot 5699968 \cdot 693724 \cdot 1 \cdot 441494 \cdot 8216469 \cdot 159667 \cdot 15967 \cdot$	685141	1-459552	8249491	3545	-5699968	-693724	1-441494	8216469	2
2	5603981	-676626	1-477919	8282234	55 26	$\cdot 5603981 \cdot 6766261 \cdot 477919 \cdot 8282234 \cdot 5526 \cdot 5654469 \cdot 685569 \cdot 458642 \cdot 8247847 \cdot 3446 \cdot 5702357 \cdot 6941551 \cdot 440599 \cdot 8214811 \cdot 146669 \cdot 676626 \cdot 6766$	692289-	1-458642	8247847	3446	-5702357	-694155	1-440599	8214811	=
9	-5606390	.677050	1-476993	8280603	54 27	$-5606390 \cdot 677050 \cdot 1 \cdot 476993 \cdot 8280603 \cdot 5427 \cdot 5656868 \cdot 685996 \cdot 1 \cdot 457732 \cdot 8246202 \cdot 3347 \cdot 5704747 \cdot 694586 \cdot 1 \cdot 439704 \cdot 8213152 \cdot 138167 \cdot 1381$	966289	1-457732	8246202	3347	-5704747	.694586	1-439704	8213152	150
-	5608798	677475	1-476068	8278972	53 28	-5608798 677475 1-476068 8278972 5328 5659267 686424 1-456824 8244556 3248 5707136 695018 1-438811 6211492 12	686424	1-456824	8244556	3248	-5707136	-695018	1.438811	8211492	=
00	-5611206	668119	1-475144	8277340	52 29	$\cdot 3611206 \cdot 677899 \cdot 1475144 \cdot 8277340 \cdot 529 \cdot 5661665 \cdot 686852 \cdot 455916 \cdot 8242909 \cdot 3149 \cdot 5709524 \cdot 695449 \cdot 437918 \cdot 8209832 \cdot 6611206 \cdot 677899 \cdot 677999 \cdot 677899 \cdot 677899 \cdot 677899 \cdot 677899 \cdot 677899 \cdot 677899 \cdot 67789$	686852	1-455916	8242909	3149	-5709524	695449	1-437918	8209832	Ξ
6	-5613614	678324	1-474221	8275708	51 30	$9.5613614 \cdot 678324 \cdot 1474221 \cdot 8275708 \cdot 51 \cdot 30 \cdot 5664062 \cdot 687281 \cdot 1455009 \cdot 8241262 \cdot 30 \cdot 5711912 \cdot 695881 \cdot 1437026 \cdot 8208170 \cdot 100 \cdot 10$	182780	1-455009	8241262	3050	5711912	.695881	1-437026	8208170	=
10	5616021	678749	1-473298	8274074	50 31	$10.5616021 \cdot 678749 \cdot 1.473298 \cdot 8274074 \cdot 50 \cdot 81.566459 \cdot 687709 \cdot 1.454102 \cdot 8239614 \cdot 29 \cdot 5714299 \cdot 696313 \cdot 1.486135 \cdot 8206509 \cdot 1.486187 \cdot 1.48618 \cdot 1.4$	604489	1.454102	8239614	29 51	-5714299	696313	1-436135	8206509	93
=	5618428	-679174	1-472376	8272440	49 32	$1.5618428 \cdot 679174 \cdot 472376 \cdot 8272440 \cdot 49 \cdot 32 \cdot 5668856 \cdot 688137 \cdot 453197 \cdot 8237965 \cdot 2852 \cdot 5716686 \cdot 696745 \cdot 1.435245 \cdot 8204846 \cdot 1.1435245 \cdot 1$	688137	1-453197	8237965	28 52	.5716686	-696745	1-435245	8204846	w
64	.5620834	6462649	1-471455	8270806	48 33	12.5620834.6795991.471455.82708064833.5671252.6885661.452292.82363162753.6719073.6971771.434355.8203183	999889	1.452292	8236316	27 53	-5719073	-697177	1-434355	8203183	2-
13	-5623239	680024	1-470535	8269170	47 34	-5622239 - 680024 + 470535 - 8269170 - 47 34 - 5673648 - 688995 + 451388 - 822466 - 2654 - 5721459 - 697609 + 433466 - 8201519 - 562239	6888995	1-451388	8234666	2654	-5721459	609469-	1-433466	8201519	-
I	.5625645	680450	1-469615	8267534	4635	·5625645 680450 1-469615 8267534 46 35 -5676043 689424 1-450485 8233015 25	689424	1.450485	8233015	25 55	55 5723844 698042 1.432578 8199854	.698042	1-432578	-8199854	-
12	.5628049	680875	1-468696	8265897	45 36	$15.5628049 \cdot 680875 \cdot 1 \cdot 468696 \cdot 8265897 \cdot 45 \cdot 36 \cdot 5678437 \cdot 689853 \cdot 1 \cdot 449582 \cdot 823156 \cdot 24 \cdot 56 \cdot 5726229 \cdot 698474 \cdot 1 \cdot 431690 \cdot 8198189 \cdot 1 \cdot 5688675 \cdot 1 \cdot 468696 \cdot 8198189 \cdot 1 \cdot $	689853	1-449582	8231364	24 56	-5726229	698474	1-431690	8188189	-
91	-5630453	681301	1-467778	8264260	44 37	$16.5630453 \cdot 681301 \cdot 1467778 \cdot 8264260 \cdot 4437 \cdot 5680832 \cdot 690283 \cdot 1448680 \cdot 8229712 \cdot 2357 \cdot 5728614 \cdot 698907 \cdot 1430803 \cdot 8196523 \cdot 1448680 \cdot 8229712 \cdot 2357 \cdot 5728614 \cdot 698907 \cdot 1430803 \cdot 8196523 \cdot 1448680 \cdot 8229712 \cdot 2357 \cdot 5728614 \cdot 698907 \cdot 1430803 \cdot 8196523 \cdot 1448680 \cdot 8229712 \cdot 2357 \cdot 5728614 \cdot 698907 \cdot 1430803 \cdot 8196523 \cdot 1448680 \cdot 8229712 \cdot 2357 \cdot 5728614 \cdot 698907 \cdot 1448680 \cdot 144860 $	690283	1-448680	8229712	23 57	.5728614	£06869·	1,430803	8196523	**
1	-5632857	681727	1-466861	8262622	43 38	$-6522857 \cdot 681727 \cdot 1466861 \cdot 8262622 \cdot 4338 \cdot 5683225 \cdot 690712 \cdot 1447779 \cdot 8228059 \cdot 2288$	690712	1-447779	8228059	22 58	-5730998	-699340	1.429917	8194856	
90	-5635260	682153	1-465945	8260983	42 39	$\cdot 5635260 \cdot 682153 \cdot 1 \cdot 465945 \cdot 8260983 \cdot 42899 \cdot 5685619 \cdot 691142 \cdot 1 \cdot 446879 \cdot 8226405 \cdot 2159 \cdot 5733381 \cdot 699774 \cdot 1 \cdot 429932 \cdot 8193189 \cdot 59876 \cdot 5733381 \cdot 699774 \cdot 1 \cdot 429932 \cdot 8193189 \cdot 59876 \cdot 5733381 \cdot 699774 \cdot 1 \cdot 429932 \cdot 8193189 \cdot 1 \cdot 4289778 \cdot 1 \cdot 428978 \cdot 1 \cdot $	-691142	1-446879	8226405	21 59	-5733381	-699774	1,429032	8183189	
2	-5637663	682580	1-465029	8259343	41 40	[9-5637663-682580 1-465029-8259343 41 40-5688011-691572 1-445980-8224751 20 60-5735764 -700207 1,428148-8191520	691572	1-445980	8224751	20 60	5735764	.700207	1.428148	8191520	
3	2640066 -683006 1.464114 -8257703 40	-683006	1.404114	8257703	40										
	Cosine.	Cotang, Tang.	Tang.	Sine.	1 1	, Cosine. Cotang.	Cotang.	Tane.	Sine.	1	Cosine. Cotang.	Cotano.	Tane.	Sine	-

Deg. 54.

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	1	15	-	-			=	-	-	Ξ	=		_		_	_	_			_	_		<u> </u>	.
	Cosine.	8122532	8120835	-8119137	-8117430	8115740	8114040	-8112339	8110638	8108936	8107234	8105530	8103826	8102122	8100416	8098710	8097004	8095296	8093588	8091879	8090170		Sine.	
.•	Sine. Tang. Cotang. Cosine.	1.392501	1-391647	1-390793	1.389940	1.389087	1.388235	1.387384	1-386534	1-385684	1-384835	1-383986	1.383139	1.382292	1-381445	1-380600	1-379755	1.378910	1.378067	1.377224	1.376381		Tang.	
	Tang.	718131	.718572	-719014	-719455	719897	.720338	.720780	.721222	721665	.722107	.722550	.722993	.723436	.723879	.724322	.724766	.725210	.725654	726098	.726542		Cotang	
35 Deg.	Sine.	-5833050	5835412	5837774	5840136	5842497	5844857	5847217	5849577	5851936	5854294	5856652	.5859010	5861367	5863724	5866080	5868435	-5870790	5873145	-5875499	-5877853		Cosine. Cotang.	
35	\subseteq	41	42	43	44	45	46	47	48	49	50	51	52	53	75	55	99	22	58	59	9		1]
		39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20		-	1 :
	Cosine	8156330	8154647	8152963	8151278	8149593	8147906	8146220	8144532	8142844	8141155	·8139466	8137775	\$ 136084	-8134393	8132701	8131008	8129314	.8127620	8125925	8124229		Sine.	
	Cotang. Cosine	1-409740	1.408871	1-408003	1.407136	1-406270	1.405404	1-404539	1.403674	1.402811	1.401948	1.401086	1.400224	1-899363	1-398503	1-397644	1-396785	1.395927	1-395069	1.394213	1-39335.		Tang.	
	Tang.	-709350	·709787	.710225	·710663	.711100	.711539	7111977	712415	.712854	.713293	.713732	714171	714610	.715050	.715489	.715929	.716369	.716810	.717250	.717691		Cotang.	
35 Deg.	Sine.	5785696	.5788069	5790440	5792812	5795183	5797553	-5799923	5802292	5804661	5807030	5809397	.5811765	5814132	5816498	5818864	.5821230	-5823595	5825959	5828323	5830687		Cosine. Cotang.	
35	,	21	្ត	8	43	25	88	27	88	58	9	31	33	33	34	32	38	34	38	3	40		-	
	,	9	59	58	57	56	55	54	53	22	51	20	49	48	47	46	45	44	43	42	41	40	\	1:
	Cosine.	-5735764 -700207 -428148 -8191520 6021 -5785696 -709350 -409740 -8156330 3941 -5833050 -718131 1-392501 -81225532 10	5738147 700641 1 427264 6189852 5588069 709787 1 408871 8154647 3842 5835412 718572 1 391647 8120835 13	$ \begin{array}{c} \textbf{.5740529} \\ \textbf{.701074} \\ \textbf{1.426381} \\ \textbf{.5812815828} \\ \textbf{.5790440} \\ \textbf{.710225} \\ \textbf{1.408003} \\ \textbf{.8152963} \\ \textbf{377748} \\ \textbf{.719014} \\ \textbf{1.390793} \\ \textbf{.8119137} \\ \textbf{.719014} \\ $	$ \cdot 5748911 \cdot 7015081 \cdot 425498 \cdot 8186512 \cdot 5722812 \cdot 7106631 \cdot 407136 \cdot 8151278 \cdot 36144 \cdot 5840136 \cdot 719455 \cdot 389940 \cdot 8117439 \cdot 108691 \cdot 710689 \cdot 7106$	$\cdot 5745292 \cdot 701943 \cdot 1 \cdot 424617 \cdot 918484 \cdot 1 \cdot 5626 \cdot 5795183 \cdot 711100 \cdot 1 \cdot 406270 \cdot 9149593 \cdot 3545 \cdot 5842497 \cdot 719897 \cdot 71989$	$-5747672 \cdot 7023771 \cdot 423736 \cdot 9183169 \cdot 5526 \cdot 5797553 \cdot 711539 \cdot 1405404 \cdot 8147906 \cdot 3446 \cdot 5844657 \cdot 720338 \cdot 1.988235 \cdot 8114401140 \cdot 14401140 \cdot 144010 \cdot$	$ \cdot 5760063 \cdot 702811 \cdot 1.422856 \cdot 9181497 \cdot 5427 \cdot 5799923 \cdot 711977 \cdot 1.404539 \cdot 9146220 \cdot 3347 \cdot 5847217 \cdot 720780 \cdot 1.387384 \cdot 8112339 \cdot 131239 \cdot 131299 \cdot 1$	$ \cdot 5752432 \cdot 703246 \cdot 1 \cdot 421976 \cdot 8179824 \cdot 5328 \cdot 5802292 \cdot 712415 \cdot 1 \cdot 403674 \cdot 8144532 \cdot 32148 \cdot 5849577 \cdot 721222 \cdot 1 \cdot 396534 \cdot 8110638 \cdot 1 \cdot $	-5754811 -703681 -421097 -8178151 5229 -5804661 -712854 -402811 -8142844 31 49 -5851936 -721665 1-385684 -8108936 -81428444 -814284444 -81428444 -81428444 -81428444 -81428444 -81428444 -81428444 -81428444 -814284444444444 -8142844444 -814284444444 -8142844444 -81428444444 -814284444	$ \textbf{-5757190} \cdot \textbf{704116} \cdot \textbf{1-420220} \cdot \textbf{9176476} \cdot \textbf{5130} \cdot \textbf{5807030} \cdot \textbf{713293} \cdot \textbf{1-401948} \cdot \textbf{8141155} \cdot \textbf{30} \cdot \textbf{50} \cdot \textbf{50} \cdot \textbf{587635} \cdot \textbf{8107234} $	$40 \cdot 5759568 \cdot 704551 \cdot 1419342 \cdot 9174801 \cdot 5031 \cdot 5809397 \cdot 713732 \cdot 1401086 \cdot 8139466 \cdot 2951 \cdot 5856652 \cdot 722550 \cdot 1283986 \cdot 8105530 \cdot 1283986 \cdot 128396 \cdot 1283986 \cdot$	$11 \cdot 5761946 \cdot 704986 \cdot 1 \cdot 418466 \cdot 8173125 \cdot 4932 \cdot 5811765 \cdot 714171 \cdot 400224 \cdot 8137775 \cdot 2859 \cdot 5859010 \cdot 722993 \cdot 1 \cdot 383139 \cdot 8103826 \cdot 1 \cdot 10000000000000000000000000000000$	$ \begin{array}{c} (2) 6764323 \cdot 706422 1 \cdot 417590 \cdot 8171449 \mid 48 \mid 33 \cdot 5814132 \cdot 714610 \mid 1 \cdot 399363 \mid 9 \cdot 136084 \mid 27 \mid 53 \cdot 5861367 \cdot 723436 \mid 1 \cdot 382292 \cdot 8 \mid 102122 \mid 1 \cdot 381281 \mid 1 \cdot 381281 \mid 1 \cdot 381281 \mid 1 \cdot 3812811 \mid 1 \cdot 3812811 \mid 1 \cdot 3812811 \mid 1 \cdot 3812811 \mid 1 \cdot 3$	$398503 \cdot 9134393 \cdot 2654 \cdot 5863724 \cdot 723879 \cdot 715050 \cdot 1398503 \cdot 9134393 \cdot 2654 \cdot 5863724 \cdot 723879 \cdot 1391445 \cdot 81004 \cdot 1659756 \cdot 123879 \cdot 1381445 \cdot 81004 \cdot 166979 \cdot 1381445 \cdot 1381446 \cdot 1381466 \cdot $	$\{4 \\ \bullet 5768076 \\ \cdot 706294 \\ 1 \bullet 41636 \\ \cdot 580800 \\ \cdot 72432 \\ \cdot 715489 \\ \cdot 715489 \\ \cdot 797644 \\ \cdot 8132701 \\ \cdot 2555 \\ \cdot 586090 \\ \cdot 72432 \\ \cdot 728600 \\ \cdot 728600 \\ \cdot 728600 \\ \cdot 728600 \\ \cdot 72860 \\ \cdot 728600 \\ \cdot 728600 \\ \cdot 7286000 \\ \cdot 7$	$15 \cdot 5771452 \cdot 706730 \cdot 414967 \cdot 8166416 \cdot 4586 \cdot 5821230 \cdot 715929 \cdot 1\cdot 396785 \cdot 8131008 \cdot 2456 \cdot 5868435 \cdot 724766 \cdot 1\cdot 379755 \cdot 8097004$	$16 \cdot 5773827 \cdot 707166 \mid 1\cdot 414094 \mid \cdot 8164736 \mid 44 \mid 27 \mid \cdot 5823595 \mid \cdot 716369 \mid 1\cdot 395927 \mid \cdot 8129314 \mid 23 \mid 57 \cdot \cdot 5870790 \mid \cdot 725210 \mid 1\cdot 378910 \mid \cdot 8095236 \mid 1\cdot 378910 \mid \cdot 8095236 \mid \cdot 8164786 \mid 1\cdot 378910 \mid \cdot 8095236 \mid \cdot 8164786 \mid 1\cdot 378910 \mid \cdot 8095236 \mid \cdot 8164786 \mid 1\cdot 378910 \mid \cdot 8164786 \mid \cdot 816476$	$11 \cdot 5776202 \cdot 707602 \cdot 1413222 \cdot 9163056 \cdot 4338 \cdot 5825959 \cdot 716810 \cdot 1\cdot 395069 \cdot 3127620 \cdot 3258 \cdot 5873145 \cdot 725654 \cdot 1\cdot 378067 \cdot 8093588 \cdot 10000000000000000000000000000000000$	$\textbf{18.5778576.708039} \\ \textbf{14.12350.9161376.4239} \\ \textbf{-5828328.717250} \\ \textbf{17.1250} \\ \textbf{1.94213.8125925} \\ \textbf{21.159.5875499} \\ \textbf{-726098} \\ \textbf{1.977237.8991879} \\ \textbf{1.9898213.8125925} \\ \textbf{2.125925} \\$	$\textbf{19} \cdot \textbf{5780950} \cdot \textbf{708476} \cdot \textbf{1411479} \cdot \textbf{8159695} \\ \textbf{41140} \cdot \textbf{5830687} \cdot \textbf{71769} \\ \textbf{1} \cdot \textbf{39335} \cdot \textbf{8124229} \\ \textbf{20} \cdot \textbf{60} \cdot \textbf{5877853} \cdot \textbf{725542} \\ \textbf{1} \cdot \textbf{37638} \\ \textbf{1} \cdot \textbf{8090} \\ \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \\ \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \\ \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \\ \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \\ \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \\ \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \\ \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \cdot \textbf{1} \\ \textbf{1} \cdot 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-5783323 -7089 13 1-410609 8159013 40	Sine.	٤
	Tang. Cotang.	1-428148	1-427264	1.426381	1-425498	1-424617	1-423736	1.422856	1-421976	1.421097	1-420220	1.419342	1.418466	1.417590	1.416715	1.415840	1-414967	1-414094	1.413222	1 - 412350	1-411479	1-410609	Tang.	
	Tang.	700207	700641	701074	-701508	-701943	.702377	.702811	·703246	.703681	.704116	704551	.704986	.705422	-705858	.706294	.706730	.707166	-707602	.708039	-708476	-708913	Cotang	
36 Deg.	Sine.	5735764	5738147	5740529	-5742911	5745292	5747672	.6750053	.5752432	.5754811	-5757190	-5759568	-5761946	5764323	-5766700	-5769076	-5771452	5773827	5776202	5778576	.5780950	-5783323	Cosine. Cotang.	
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6 Deg.

36 Deg.

36 Deg.

Cosine. Tang. Cotang. Se080460 5922 -5929505 736366 1-358020 -8052389 3842 -5976251 74452417 1-341602 -80808460 5922 -5929505 737321 1-35554 -5942898 3644 -598051 774522 1-334160 -808081612 55625 -5938637 737712 1-35554 -8047213 3545 -598324 -747712 1-35554 -8047213 354 -598324 -7477188 1-338975 -8079899 5427 -5941217 -738161 1-35294 -8047213 354 -598324 -747673 1-333162 -8079899 5427 -5941217 -738161 1-35204 -804275 3347 -598730 -747622 1-333975 -8079899 5427 -5941217 -738161 1-35204 -804275 63347 -598730 -747642 1-337538 -8079899 5427 -74762 1-335068 -8042028 3248 -599525 -746095 1-33523 -74881 -74762 1-35244 -804299 3149 -599526 -74642 1-337538 -8073038 5031 -595294 -74011 1-352244 -804299 3149 -599526 -749095 1-33429 -8073038 5031 -595294 -740861 1-34895 -803337 5753 -600137 -74945 1-33282 -8066166 4635 -595294 -74217 -741763 1-348139 -8026440 255 -600628 -751276 1-33108 -8064446 4536 -595294 -74265 1-344139 -8026440 255 -600628 -751276 1-33108 -8066106 4433 -5965918 -74224 1-347319 -8026470 -80517 -753098 1-33265 -740661 -740661 -740661 -740661 -740661 -740661 -740661 -740661 -740661 -740661 -740661 -74061	,	19	18	17	16	15	14	13	52	11	10	6	00	1	9	10	4	60	01	H	0		
Sine, Tang, Cotang, Cosine, Tang, Co	Cosine.	8019495	8017756	8016018	8014278	8012538	8010797	8009056	8007314	8005571	8003827	8002083	8000038	7998593	7996847	7995100	7993352	7991604	7989855	7988105	7986355	j	Sine.
Sine. Tang. Cotang. Cosme. Tang. Cosm. T	Cotang.	1.342417	1.341602	1.340788	1-339975	1-339162	1.338350	1.337538	1-336727	1.335917	1.335107	1.334298	1-333490	1-332682	1.331875	1-331068	1.330262	1.329457	1.328652	1.327848	1.327044		Tang.
Sine. Tang. Cotang. Cosme. Tang. Cotang. Cosme. Tang. Cotang. Cosme. Tang. Cotang. Cosme. Tang. Cosm.	Tang.	-744924	.745377	.745829	.746282	·746735	.747188	-747642	.748095	.748549	-749003	749457	.749911	750366	750821	751276	751731	.752186	752642	.753098	753554		Cotang.
Sine. Tang. Cotang. Cosme. Sine. Tang. Cotang. Cosme. O	Sine.	5973919	5976251	5978583	5980915	5983246	5985577	5987906	5990236	5992565	5994893	5997221	5999549	6001876	6004202	8299009	6008854	6011179	6013503	6015827	6018150,		Cosine.
Sine. Tang. Cotang. Cosme. Sine. Tang. Cotang. Cosme. Cosme. Tang. Cotang. Cosme. Cosm. Co		41	42	43	44	45	46	47	48	49	20	21	25	53	54	55	- 99	57	58	- 69	09	100	
Sine. Tang. Cotang. Cosme. Tang. Cotang. Cosme. Tang. Cotang. Cotang. Cosme. C5877853 77264421.376381 8090170 6021.5927163 735917 1-358848 8054113 1-5880206 7726997 1-375409 8086749 5825-5929605 736366 1-358020 8052389 2-5882556 7277431 1-374699 8086749 5825-59384847.736814 1-3577193 80505664 4 5887262 7727431 1-373619 80863749 5825-593863 1-356367 8042838 4 5887261 7728771 1-373819 80863749 5825-593863 1-37664 8087818 57264 5737711 1-355544 8047756 5891964 7729212 1-371342 8079818 5 526-5938871 738162 1-35391 8047756 5891964 7729212 1-371342 8079818 5 52894580 733911 1-353244 8040299 9 5899012 7730561 1-3693659 1-3694580 7730491 1-35060 8033875 11 5509360 1-36831 807474 5 520 524928 7739961 1-352244 8040299 9 5890012 77309961 1-3694580 77309961 1-3694580 77309961 1-3694580 77309961 1-364421 1-36500 8033875 11 55093404 77323361 1-365326 8067868 473452 5955249 7742411 1-350600 8033875 11 55093404 77323361 1-365326 8067868 473452 5959913 7742241 1-348139 8031642 11 55913096 77327831 1-365325 8067865 473455 5959913 7742241 1-348139 8031642 11 55913096 77327831 1-365325 8066106 46 35 5959913 774224 1-344131 1-356501 8023909 15 5913096 77327831 1-365325 80659283 4239 5965918 7742565 1-346501 8023175 11 55917487 7-344131 1-361333 805786 473 5965918 7734285 8057865 473 5965918 7734285 8057865 473 5965918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734285 805786 473 5966918 7734283 8021232 805786 473 505786 7744772 1.343233 8021232 8021232 773476 805786 4740 5971586 774472 1.343233 8021232 8021232 773476 805786 774472 1.343233 8021232 8021232 773476 80558376 805786 7744772 1.343233 8021232 8021232 8021232 805786 7748568 8074472 1.343233 8021232 8021232 805786 8057		39	38	37	36	35	34	33	35	31	30	53	38	27	56	25	24	23	25	21	20		-
Sine. Tang. Cotang. Cosme. Tang. Cotang. Cotang. O 6827853 7255421 725542 137538 8090170 6021 5927163 735917 1358848 1 5880206 725987 1-375540 8088460 5922 5929505 735361 1-355020 2 5882558 727451 1-374699 8086749 5825 5934897 737712 1-3555241 4 5887265 727451 1-372809 8086749 5825 5936857 737712 1-355541 5 5884910 7227861 1-373819 8085325 5625 5938639 733712 1-355541 6 58891964 7229212 1-371342 8079899 5427 5-594121 738162 1-35341 1-353891 7289613 728701 1-372180 8081612 5526 5938871 738162 1-35341 1-353891 7289613 728961 1-370504 80878185 5328 5945850 739961 1-353891 75894314 722958 1-370504 80878185 5328 5945850 739961 1-353891 75894314 722958 1-370504 1-389567 80774754 5120 524589 739961 1-353806 1-368831 8074754 5120 524589 739961 1-3506001 1-350038 1-366326 8067885 473 45955241 741763 1-348139 1-348967 8067885 473 4-5957577 741763 1-348139 158913096 7733230 1-36832 8067885 473 4-5957577 741763 1-348139 158913096 7733230 1-36832 8067885 473 4-5957577 741763 1-34863 158913096 7733230 1-36832 8067885 473 4-5957577 741763 1-34863 158913096 7733230 1-36832 8069383 423 5969913 742244 1-342317 1-345683 158592419 742241 1-342333 1585960 18787 734125 1-368216 8066106 4635 5969913 742244 1-342333 1585961 1-356050 18505	Cosine.	-8054113	8052389	8050664	8048938	8047211	8045484	8043756	8042028	8040299	8038569	8036838	8035107	8033375	8031642	8029909	8028175	8026440	8024705	8022969	8021232		Sine.
Sine. Tang. Cotang. Cosme. Tang. Tang. Cotang. Cosme. Tang. Cosm. Tang. Co	Cotang.	1-358848	1.358020	1.357193	1-356367	1.355541	1-354716	1-353891	1-353068	1.352244	1.351422	1.350600	6.1349779	1.348958	1-348139	1.347319	1.346501	.345683	1.344865	,344049	1.343233		Tang.
Sine, Tang, Cotang, Cosine, Sine, 158877853 T255421 1375540 8088460 5922-5929505 2 5882558 7227451 13725540 8088460 5922-5929505 2 5882558 7227451 13724899 80885729 5823-5831847 8 5882910 7227751 13724899 80885729 5823-5831847 8 5882910 7227751 13724899 80885729 5823-5831847 8 588951 7228767 1372489 80885725 5526-5938530 1 588961 7228767 1372489 80885725 5526-5938851 1 370504 8078155 5528 5943550 1 7589431 4722658 1 370504 8078155 5528 5943550 1 5589663 773040 1 158657895 8078155 5528 5943550 1 55901361 773049 1 1367161 80773038 5091 5950566 1 1 55901309 7731442 1 367761 80773038 5091 5950566 1 1 5590750 1 36538 8067885 4734 595599 1 36538 8067885 4734 595591 1 36538 8067885 4734 595591 1 36538 8067885 4734 595591 1 36538 8067885 4734 595591 1 36538 8062786446 4536 5956918 1 1 5591776 7 734125 1 365385 8062786 4437 5965918 1 365918464 7734 5734125 1 365385 8062786 4437 5965918 1 365918 58287 8062786 4437 5965918 1 365918 58287 8062786 4437 5965918 1 365918 1 3559676 8055837 40 5971586 1 3652481 1 365585 8055837 40 5971586 1 3654819 7735469 1 359676 8055837 40	Tang.	735917	736366	736814	737263	737712	738162	738611	7390687	739511	739961	740411	740861	741312 1	7417631	742214 1	742665 1	743117	743568 1	744020	744472 1		Cotang.
Sine. Tang. Cotang. Cosme. 6.5877853 7225421 375540 8088466 5922 2 5882558 722421 1374599 8086749 5822 2 5882558 727451 1374599 8086749 5822 2 5882558 727451 1372459 8086749 5822 2 5882916 7228786 1373590 8081612 5526 6 5891964 729271 1372180 8081615 5526 6 5891964 729271 1371342 8079899 5427 7 589431 472958 1370540 8078185 5328 9 589063 730104 136967 80778185 5328 9 5890603 73014 136967 80773038 5031 11 5903709 731442 1367161 8071321 49 32 12 5906057 731389 136536 8069603 44 338 12 5906057 732386 136536 8069603 44 338 15 5913096 733230 136536 80696166 46 35 15 5913096 733230 136536 80691005 44 338 15 5920132 733471 1362966 8066166 46 35 6 5913096 733280 136536 8069004 44 37381 136135 8069233 42 39 12 5922476 73350 1 360505 80657560 4140	Sine.	5927163	5929505	5931847	5934189	5936530	5938871	5941211	5943550	5945889	5948228	5950566	5952904	5955241	5957577	5959913	5962249	5964584	5966918	5969252	5971586		Cosine.
Sine. Tang. Cotang. Cosine. 7 6 0.5877853 7225542 1.375381 8090170 60 1 5880206 7226987 1.375540 8088346 59 2 5882558 72274231 1.374599 80887749 58 3 5884910 7227876 1.373899 80887749 58 5 5891964 7229212 1.371342 8079899 54 7 5894314 7229571 1.371342 8079899 54 7 58946314 7229212 1.371342 8079889 54 8 5896605 7320404 1.36956 1.80764 8073878 85 10 5901361 730996 1.367995 8073038 50 11 5903709 731442 1.36716 8071321 49 12 590605 7731899 1.365460 8006166 46 15 5913096 7732789 1.365460 8006166 46 15 5913096 7732783 1.364660 8006166 46 16 59 5442 773857 1.365325 8067056 43 17 5917787 734195 1.363827 8054446 45 18 59073274 1.361335 8062883 4065883 4065884 406588 406588 406588 406588 406588 406588 406588 406588 406588 406588 406588 406588 406588 406588 406588 40658		21	25	53	24	55	98	27	88	68	30	31	33	33	34	35	36	37	38	89	40		-
Sine. Tang. Cotang. Cosine. 65877853 726542 1.376381 8090170 1.5880206 726987 1.375540 8085450 2.588256 727431 1.374599 8086749 3.5882910 727876 1.372859 8086332 5.5882913 7228767 1.3728190 8086332 5.5891964 729212 1.372180 8079893 7.5894314 729558 1.372816 8079899 7.5894314 729558 1.370504 8079899 5.5899012 730509 1.369667 8074754 1.390912 730509 1.369667 8074754 1.390912 730509 1.369632 8073038 11.5903709 731442 1.367161 8071321 1.3590605 7731889 1.365326 8067865 1.3590136 732783 1.365493 8067865 1.3590136 732783 1.365698 8067786 1.35917787 7324125 1.365256 8065726 1.3590132 7324125 1.362165 8061005 1.3590132 7324125 1.362565 805786 1.3590132 7324125 1.360505 805766 1.3590132 7334125 1.380505 805786 1.3590132 7334125 1.380505 805786 1.3590132 7334125 1.380505 805786 1.3590132 7334125 1.380505 805786 1.3590132 7334125 1.380505 805786 1.3590132 7334125 1.380505 805786 1.3590132 7334125 1.380505 805786 1.3590132 7334125 1.380505 805786 1.380505	V.	60	59	58	57	56	55	54	53	53	51	50	49	48	47	46	45	44	43	42	41	40	`
Sine. Tang. Cotang. 0.5877853 726542 1.376341 1.5880206 726987 1.375540 2.588256 727431 1.374593 3.5884910 727876 1.373859 4.5887262 728321 1.373019 6.5891964 729212 1.371342 7.5844314 729568 1.370504 8.589663 730104 1.369667 9.5899012 730550 1.387995 11.5903709 731442 1.387191 12.5906057 731899 1.367995 13.5908404 732336 1.365493 14.59 10750 732781 1.387995 15.5913096 7323230 1.363827 16.5917787 732475 1.387965 16.5917787 732475 1.387965 16.5917787 732475 1.387965 16.5917787 732475 1.387965 16.5917787 73278 1.387965 16.5917787 732475 1.387965 16.5917787 732475 1.387965 16.5917787 732475 1.387965 16.5917787 732475 1.387965 16.590132 73278 1.387965 16.5917787 732475 1.387965 16.5917787 732475 1.387965 16.5920132 7325469 1.3879676	Cosine.	8090170	8088460	8086749	8085037	8683325	8081612	8079899	8078185	8076470	8074754	8073038	8071321	8096908	8067885	8066166	8064446	8062726	8061005	8059283	8057560	8055837	Sine.
Sine. Tang. 1 5880206 726543 2 5882558 727451 3 5882510 727876 4 5887262 728767 6 5891964 729212 7 5844314 729558 7 5844314 729558 8 5896057 731889 13 59689012 730596 10 5901361 730996 11 5903709 731442 2 5908404 733877 12 5908404 733877 13 591787 734125 15 5913996 733230 16 591542 733877 17 5917787 734125 18 5920132 734573	Cotang.	1-376381	1-375540	1.374699	1-373859	1.373019	1.372180	1.371342	1.370504	1-369667	F368831	1-367995	1917861	1.366326	1.365493	1.364660	1.363827	1.362996	1.362165	1.361335	1-360505	1-359676	Tang.
Sine. 1-5880206 2-5882558 3-5884910 4-5887262 6-5891964 7-5894314 8-5896653 9-5899012 11-5906057 11-5903709 12-5906057 13-5913096 16-5913096 16-5913096 16-5913096 16-5913096 16-5913096 16-5913096 16-5913096	Tang.	726542	726987	_	727876	728321	728767	729212	729658	730104	730550	730996	731442	731889	732336	732783	733230	733677	734125	734573	735021	735469	Cotang.
0-00-00-00-00-00-00-00-00-00-00-00-00-0	Sine.	5877853	5880206	5882558	5884910	5887262	5889613	5891964	5894314	5896663	5899012	5901361	5903709	5906057	5908404	5910750	5913096	5915442	5917787	5920132	5922476	6181769	Cosine.
		0	-	-	50	4	10	_	7	-	6	0	-		3		20	9	1	9	8	9	-

Deg. 53.

53.

37 Deg. 37 Deg.

1	1.9	18	17	16	15	14	13	25	11	10	6	00	7	9	10	4	9	65	-	0	1.	200
Cosine.	-7914014	7912235	-7910456	9298067	9689064	·7905115	7903333	.7901550	7899767	7897983	7896198	7894413	7892627	7890841	7889054	7887266	7885477	7883688	7881898	7880108	Sine.	Doe 50
Cotang.	1-294627	$-6020473 \cdot 754010 \cdot 1.326242 \cdot 7984604 \cdot 5982 \cdot 6089136 \cdot 763636 \cdot 1.309523 \cdot 7947678 \cdot 3842 \cdot 6115270 \cdot 772887 \cdot 1.293848 \cdot 7912235 \cdot 7912236 \cdot 791226 \cdot 79126 \cdot 79$	1-293071	$6025117 \cdot 754923 \cdot 1 \cdot 324638 \cdot 7981100 \cdot 57 \cdot 24 \cdot 6073758 \cdot 764557 \cdot 1 \cdot 307945 \cdot 7944146 \cdot 36 \cdot 44 \cdot 6119873 \cdot 773817 \cdot 1 \cdot 292294 \cdot 7908676 \cdot 7944146 \cdot 36 \cdot 44 \cdot 6119873 \cdot 773817 \cdot 1 \cdot 292294 \cdot 7908676 \cdot 790867$	1.291517	1-290742	996682-1	1-289192	1.288418	1.287644	1.286871	660987-1	1-285327	1-284556	.283786	-283016	.282246	-281477	-280709	279941	Tang.	
Tang.	772423	772887	.773352	773817	.774282	.774748	.775213	9775679	776145	.776611	870777	7777544	110877	778478	778946	779413	1779881	780349	780817	781285		
Sine.	-6112969	6115270	6117572	6119873	6122173	6124473	6126772	6129071	6131369	6133666	6135964	6138260	6140556	6142852	6145147	6147442	6149736	6152029	6154322	9156615	/ Cosine. Cotang.	
	41	42	13	44	45	46	47	48	49	20	51	52	53	54	55	99	57	58	169	00	-	
	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	10	21	20	-	63
Cosine.	-7949444	·7947678	-7945918	.7944146	-7942379	7940611	·7938843	·7937074	·7935304	.7933533	7931762	7929990	7928218	7926445	7924671	7922896	7921121	7919345	7917569	7915792	Sine.	Dan 59
Cotang.	1.310314	1.309523	1-308734	1-307945	1-307157	1-306369	1.305582	304796	.304010	303225	-302440	-301656	300873	3000001	-299308	-298526	-297745	-296964	-296185	295405	Tang.	
Tang.	763175	.763636	764096	764557	.765018	765480	765941	766403	766864	767327	767789	768251	768714 1	1421697	769640 1	770103 1	770567 1	771030 1	771494 1	771958		
Sine.	6066824	6089136	6071447	6073758	6909209	6078379	6890809	8662809	6085306	6087614	8089922	8092229	5094535	9096841	3099147	3101452	103756	.0909019	108363	999011	Cosine. Cotang.	
•	25	55	23	24	25	. 92	27	28	29	30	31	32	33	34	35 .	96	37 6	38 -6	39 68	9.01		
	9	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	422	417	-	69
Cosine.	7986355	·7984604	7982853	7981100	7979347	7977594	7975839	7974084	7972329	7970572	7968815	7967058	7965299	7963540	7961780	7960020	7958259	7956497	7954735	7952972	Sine.	Dec. 69.
Cotang.	1.327044	1.326242	1-325439	1.324638	1.323837	1-323036	.322237	321437	-320639	319841	319044	318247	317451	316655	315861	.315066	314273	.313480	.312687	311895	Tang.	
Tang.	.753554	.754010	.754466	754923	.755379	755836	756294	756751	757209 1	757666	758124	758582 1	759041 1	759499 1	759958 1	760417 1	760876	761336 1	761795 1	762255 1	Cotang.	
Sine.	0-6018150 -753554 1-327044 -7986355 6021 -6066824 -763175 1-310314 -7949444 3941 -6112969 -772423 1-294627 -7914014	-6020473	$\cdot 6022795 \cdot 754466 \cdot 1 \cdot 325439 \cdot 7982853 \cdot 5823 \cdot 6071447 \cdot 764096 \cdot 308734 \cdot 7945913 \cdot 37143 \cdot 6117572 \cdot 773352 \cdot 1 \cdot 293071 \cdot 7910456 \cdot 1 \cdot $	6025117	$\cdot 6027439 \cdot 755379 \cdot 755379347 \cdot 7979347 \cdot 5625 \cdot 6076069 \cdot 765018 \cdot 307157 \cdot 7942379 \cdot 3545 \cdot 6122173 \cdot 774282 \cdot 1291517 \cdot 7906896 \cdot 120717 \cdot 12$	$-6029760 \cdot 755836 \cdot 7937594 \cdot 5526 \cdot 6078379 \cdot 765480 \cdot 306369 \cdot 7940611 \cdot 3446 \cdot 6124473 \cdot 774748 \cdot 1\cdot 290742 \cdot 7905115 \cdot 7$	$\cdot 6032080 \cdot 756294 \cdot 1 \cdot 322237 \cdot 7975839 \cdot 1 \cdot 2	$+6034400 \cdot 766751 \cdot 1 \cdot 321437 \cdot 7974084 \cdot 5328 \cdot 6082998 \cdot 766403 \cdot 1 \cdot 304796 \cdot 7937074 \cdot 3248 \cdot 6129071 \cdot 775679 \cdot 1 \cdot 289192 \cdot 7901550 \cdot 1289198 \cdot 7901550 \cdot 1 \cdot 289198 \cdot 790196 $	$\cdot 6036719 \cdot 757209 \cdot 1 \cdot 320639 \cdot 7972329 \cdot 62329 \cdot 6085306 \cdot 766864 \cdot 1 \cdot 304010 \cdot 7935304 \cdot 3149 \cdot 6131369 \cdot 776145 \cdot 1 \cdot 288418 \cdot 7899767 \cdot 1 \cdot $	$\cdot 6039038 \cdot 757666 \cdot 1 \cdot 31984 \cdot 1 \cdot 970572 \cdot 51 \cdot 30 \cdot 6087614 \cdot 767327 \cdot 1 \cdot 303225 \cdot 7933533 \cdot 30 \cdot 60 \cdot 613366 \cdot 776611 \cdot 287644 \cdot 7897983 \cdot 1 \cdot 30886 \cdot 1 \cdot $	$\cdot 6041356 \cdot 758124 \cdot 1 \cdot 319044 \cdot 7968815 \cdot 5031 \cdot 6089922 \cdot 767789 \cdot 1 \cdot 302440 \cdot 7931762 \cdot 2951 \cdot 6135964 \cdot 777078 \cdot 1 \cdot 286871 \cdot 7896198 \cdot 1 \cdot 286871 \cdot 1 \cdot 28671 \cdot 1 \cdot$	$6043674 \cdot 758582 \cdot 1 \cdot 318247 \cdot 7967058 \cdot 49 \cdot 32 \cdot 6092229 \cdot 768251 \cdot 1 \cdot 301656 \cdot 7929990 \cdot 28 \cdot 52 \cdot 6138260 \cdot 777544 \cdot 1 \cdot 286099 \cdot 7894413 \cdot 1 \cdot 286099 \cdot 7777544 \cdot 777754 \cdot $	-6045991.759041[1.317451[-7965299]48[33]-6094535[-768714]1.300873[-7928218]27[53]-6140556[-778011]1.285327[-789262]	$\cdot 6048308 \cdot 759499 \cdot 1 \cdot 316655 \cdot 7963540 \cdot 47 \cdot 34 \cdot 6096841 \cdot 769177 \cdot 1 \cdot 300090 \cdot 7926446 \cdot 26 \cdot 54 \cdot 6142852 \cdot 778478 \cdot 1 \cdot 284556 \cdot 789084 \cdot 1 \cdot 38458 \cdot 1 \cdot 38458 \cdot 1 \cdot 38458 \cdot 1 \cdot 384684 \cdot 1 \cdot 38468 \cdot 1 \cdot 384684 \cdot 1 \cdot 38468 \cdot 1$	$\cdot 6050624 \cdot 759958 1 \cdot 315861 \cdot 7961780 46 35 \cdot 6099147 \cdot 769640 1 \cdot 299308 \cdot 7924671 25 55 \cdot 6145147 \cdot 778946 1 \cdot 283786 \cdot 7889054 \cdot 7889054 $	-6052940 -760417 1.315066 -7960020 $45 36$ -6101452 -770103 1.298526 -7922896 $24 56$ -6147442 -779413 1.283016 -7887266	$\cdot 6055255 \cdot 760876 \cdot 1 \cdot 314273 \cdot 7958259 \cdot 4487 \cdot 6103756 \cdot 770567 \cdot 1 \cdot 297745 \cdot 7921121 \cdot 2357 \cdot 6149736 \cdot 779881 \cdot 1 \cdot 282246 \cdot 7885477 \cdot 1 \cdot 282246 \cdot 78857 \cdot 1 \cdot 28246 \cdot 78857 \cdot 1 \cdot 282246 \cdot 78857 \cdot 1 \cdot 282246 \cdot 78857 \cdot 1 \cdot 28246 \cdot 1 \cdot $	$\cdot 6057570 \cdot 761336 1.313480 \cdot 7956497 43 38 \cdot 6106060 \cdot 771030 1 \cdot 296964 \cdot 7919345 22 58 \cdot 6152029 \cdot 780349 1 \cdot 281477 \cdot 7883688 \cdot 6152029 \cdot 780349 1 \cdot 281477 \cdot 7883688 \cdot 6152029 \cdot 780349 $	$8.6059884 \cdot 761795 \cdot 1.312687 \cdot 7954735 \cdot 4299 \cdot 6108363 \cdot 771494 \cdot 1.296185 \cdot 7917569 \cdot 2159 \cdot 6154322 \cdot 780817 \cdot 1.280709 \cdot 7881898 \cdot 1.280709 \cdot 1$	$\begin{array}{c} 19.6062198.762255 \ 1.311895 \ 1.75292724140 \ -6110666.771958 \ 1.295405.7915792 \ 2060.6156615 \ 781285 \ 1.279941.7880108 \\ 20.6064511.762715 \ 1.311104.7951208.40 \end{array}$	Cosine.	
-	0	H	C.S	3	4	10	9	2	00	6	10	Ė	55	13	4	5	9	7	8	00	-	

38 Deg.

38 Deg.

38 Deg.

 $\cdot 274583 \cdot 7867555 \\ \vdots \\ 328 \cdot 6220592 \cdot 794486 \\ \vdots \\ 1.258674 \cdot 7829702 \\ \vdots \\ 3248 \cdot 6266038 \cdot 804020 \\ \vdots \\ 2.25749 \cdot 7793380 \\ \vdots \\ 2.258674 \cdot 792380 \\ \vdots \\ 2.258678 \cdot 7923$ 49 6268305 804499 1-243008 7791557 50 6270571 804979 1-242268 7789733 3743 6254696 801628 1.247460 7802485 3644 6256966 802106 1.246716 7800665 1-244490 -7795202 13 6186370 787393 1.270013 7856770 4734 6234248 797337 1.234174 7818033 2055 6281894 807378 1.238576 7780604 14.6189655 787864 1.269253 7854970 4635 6238596 798289 1.252678 7815019 2555 628157 807859 1.238576 7778777 15 6190939 788336 1.268494 7853169 45 36 6238796 798289 1.252678 7815205 2456 6284157 807859 1.237839 77776949 $1.267735 \cdot 7851368 \cdot 44 \cdot 37 \cdot 6241069 \cdot 798765 \cdot 1.251931 \cdot 7813390 \cdot 23 \cdot 57 \cdot 6286420 \cdot 808340 \cdot 1.237103 \cdot 7776949 \cdot 1.2776949 \cdot 1.27769 \cdot 1.277$ $1\cdot 2662191\cdot 7847764 | 42|39|\cdot 6245614|\cdot 799719|1\cdot 250438|\cdot 7809757|21|59|\cdot 6290943|\cdot 809302|1\cdot 225631|\cdot 77732290|1\cdot 266219|\cdot 6290943|\cdot 62909443|\cdot 62909443|\cdot 62909444|\cdot 62909444|\cdot 62909444|\cdot 6290944|\cdot 6290944|\cdot 6290944|\cdot 6290944|\cdot 6290944|\cdot 6290944|\cdot 6290944|\cdot 6290944|\cdot 629094|\cdot 629094|$ 6272837 805458 1.241529 7787909 53 -6277366 -806418 1-240051 -7784258 1.234897.7771460 Cosme. $1.279174 \cdot 7878316 \cdot 5922 \cdot 6206917 \cdot 791643 \cdot 1.263195 \cdot 7840547 \cdot 3842 \cdot 6252427 \cdot 801151 \cdot 1.248204 \cdot 7804304 \cdot 780404 \cdot 7$ 46 6261503 803063 1.245232 7797024 $11.6181798.786451 \\ 1.271534.7860367 \\ 149 \\ 32.6229698.796386 \\ 1.255672.7822459 \\ 2822459 \\ 2825459 \\ 2825459 \\ 28275102.7805938 \\ 1.240790.7786084 \\ 1.240790.778608 \\ 1.240790.$ Sine. $1.279941 \cdot 7880108 \cdot 60 \cdot 21 \cdot 6204636 \cdot 791170 \cdot 1.263950 \cdot 7842352 \cdot 3941 \cdot 6250156 \cdot 800673 \cdot 1.248948 \cdot 1.24898 \cdot 1.2489 \cdot 1.2489 \cdot 1.2489 \cdot 1.2489 \cdot 1.2489$ Tang. Cotang. Cosine, Cotang. 3545 6259235 802584 47 6263771 803541 $1.265462 \cdot 7845961 \cdot 41140 \cdot 6247885 \cdot 800196 \cdot 1.249693 \cdot 7807940 \cdot 2060 \cdot 6293204 \cdot 809784$ Tang. Sine. 1.257923 7827892 31 -273057 -7863963 51 30 -62251461-795435 11-257172 -7826082 30 -272295 7862165 50 31 -6227423 795911 1-256421 7824270 29 $\cdot 6184084 \cdot 786922 \cdot 1 \cdot 270773 \cdot 7858569 \cdot 4833 \cdot 6231974 \cdot 796861 \cdot 1 \cdot 254922 \cdot 7820646 \cdot 27820646 \cdot 2782066 \cdot 2782066 \cdot 2782066 \cdot 278206 \cdot$ Deg. 51. 24 -6211478 -792590 1-261686 -7836935 -276111 -7871145 55 26 -6216036 -793537 1-260179 -7833320 278407 7876524 58 23 6209198 792116 1 262440 7838741 1-260932 -7835127 27 -6218314 -794012 1-259426 -7831511 Cosine. Sme. Cotang. Tang. Cotang. 25 6213757 793064 -273820 -7865759 52 29 -6222870 -79 1961 Tang. Cosine, Sine, -276876 -7872939 56 -275347 -7869350 54 277641 -7874732 57 (-264706 -7844157 40 Sine. Cosine. Jotang. Tang. -6172648 -784570 6174936 785040 086119511 -785980 6193224 788808 17 6195507 789280 18 6197790 789752 6156615 781285 -6161198 -782222 6170359 784100 -6177224 -785510 -6158907 -781754 -6168069 783630 Cotang. -6163489 -782691 19 6200073 790224 Tang. -6165780 -783161 Cosine. Sine. 65

Deg. 51.

Deg. 51.

Deg. 50.

Deg. 50.

NATURAL SINES AND TANGENTS TO A RADIUS 1.

1	Sine.	Tang.	Cotang.	Cosine.	,	,	Sine.	Tang.	Cotang.	Cosine.	1	Sine.	Tang.	Cotang.	Cosine.	-
1 7	6293204	-809784	1-234897	.7771460	09	217	5340559	819948	1-219588	.7732872	3941	6385440	829724	1-205219	0-6293204 809784 1-234897 7771460 6021 6340559 819948 1-219588 7732872 3941 6385440 829724 1-305219 7695853 19	19
-	6295464	810265	1-234162	6296944	59	52	5342808	820435	1.218865	7731027	38 42	3.6387678	830216	1.204505	$\textbf{-6295464} \cdot 810265 \cdot 1 \cdot 234162 \cdot 7769629 \cdot 5922 \cdot 6342808 \cdot 820435 \cdot 1 \cdot 218865 \cdot 7731027 \cdot 3842 \cdot 6387678 \cdot 830216 \cdot 1 \cdot 204505 \cdot 769996 \cdot 188885 \cdot 7831027 \cdot 3842 \cdot 6387678 \cdot 830216 \cdot 1 \cdot 204505 \cdot 769996 \cdot 188885 \cdot 1 \cdot 1$	18
	6297724	810747	1-233429	7877977	28	23 .	5345057	820922	1.218142	.7729182	37 43	3166889916	830707	1-203793	$-6297724 \cdot 8107471 \cdot 233429 \cdot 7767797 6823 \cdot 6345057 \cdot 820922 \cdot 218142 \cdot 7729182 3743 \cdot 6389916 830707 -203793 \cdot 7692187 17729182 -218142 \cdot 7729182 $	17
	6299983	811230	1.232696	-7765965	57	24 .	5347305	821409	$-6299983 \cdot 811230 \cdot 1 \cdot 232696 \cdot 7765965 \cdot 5724 \cdot 6347305 \cdot 821409 \cdot 7727336 \cdot 3644 \cdot 6392153 \cdot 831199 \cdot 1 \cdot 203081 \cdot 7690278 \cdot 6299983 \cdot 811230 \cdot 1 \cdot 232696 \cdot 7765965 \cdot 1 \cdot 7727336 \cdot 1 \cdot 7897378 \cdot 1 \cdot 7897778 \cdot 1 \cdot 789778 \cdot 1 \cdot 789778 \cdot 1 \cdot 789778 \cdot 1 \cdot 789778 \cdot 1 $	-7727336	3644	6392153	831199	1.203081	7690278	16
-	6302242	811712	1.231963	.7764132	56	25 .	3349553	821896	1.216698	.7725489	35 45	6394390	169188	1.202369	6302242 811712 1-231963 7764132 5625 6349553 821896 1-216698 7725489 3545 6394390 831691 1-202369 7688418 15	15
7	6304500	-812195	1.231231	.7762298	55	36 .6	3351800	822384	1.215976	7723642	34 46	1-6396626	832183	1.201658	$ \cdot 6304500 \cdot 812195 \cdot 1 \cdot 231231 \cdot 7762298 \cdot 5526 \cdot 6351800 \cdot 822384 \cdot 1 \cdot 215976 \cdot 7723642 \cdot 3446 \cdot 6396626 \cdot 832183 \cdot 1 \cdot 201658 \cdot 7686558 \cdot 14 \cdot 1 \cdot $	14
7	6306758	812678	1.230499	-7760464	54	37 .6	3354046	822871	$\textbf{-6306758} \cdot 812678 \mid 1\cdot 230499 \mid \textbf{-7760464} \mid 5427 \mid 6354046 \mid 822871 \mid \textbf{-}215256 \mid \textbf{-7721794} \mid 3347 \mid 6398862 \mid 832675 \mid \textbf{-}200947 \mid \textbf{-}7684697 \mid \textbf{-}84697 \mid \textbf{-}8$	7721794	3347	-6398862	832675	1.200947	7684697	13
7	6309015	813161	1.229768	·7758629	53	28	3356292	823359	1-214535	7719945	32,48	6401097	833168	1-200237	$\textbf{-6309015} \cdot \textbf{813161} \textbf{1} \cdot \textbf{229768} \cdot \textbf{7758629} \textbf{635829} \cdot \textbf{6356292} \cdot \textbf{823359} \textbf{1} \cdot \textbf{214535} \cdot \textbf{7719945} \textbf{3248} \cdot \textbf{6401097} \cdot \textbf{833168} \textbf{1} \cdot \textbf{200237} \cdot \textbf{7682835} 12210000000000000000000000000000000000$	12
÷	6311272	813644	1-229038	·7756794	522	39 6	3358537	823847	$\cdot 6311272 \cdot 813644 \cdot 1 \cdot 229038 \cdot 7756794 \cdot 5229 \cdot 6358537 \cdot 823847 \cdot 1 \cdot 213816 \cdot 7718096 \cdot 3149 \cdot 6403332 \cdot 833661 \cdot 1 \cdot 199527 \cdot 7680973 \cdot 833647 \cdot 1 \cdot $.7718096	3149	6403332	.833661	1-199527	7680973	=
÷	6313528	814128	1.228308	7754957	51	30 -6	3360782	824336	$9 \cdot 6313528 \cdot 814128 \cdot 1\cdot 228308 \cdot 7754957 \cdot 5130 \cdot 6380782 \cdot 824336 \cdot 1\cdot 213097 \cdot 7716246 \cdot 3050 \cdot 6405566 \cdot 634154 \cdot 1\cdot 198818 \cdot 7679110$	7716246	30 50	-6405566	834154	1.198818	7679110 1	10
÷	6315784	814611	1.227578	.7753121	50	31-6	3363026	824825	$10^{\circ} - 6315784 \cdot 814611 \cdot 1 \cdot 227578 \cdot 775312 \cdot 50 \cdot 31 \cdot 6363026 \cdot 824825 \cdot 1 \cdot 212378 \cdot 7714395 \cdot 29 \cdot 51 \cdot 6407799 \cdot 834648 \cdot 1 \cdot 198109 \cdot 7677246 \cdot 10 \cdot 1$.7714395	2951	-6407799	834648	1.198109	7677246	9
·	6318039	815095	1.226849	.7751283	49	32	385270	825314	$11.6318039 \cdot 3150951 \cdot 226849 \cdot 7751283 \cdot 49 \cdot 32 \cdot 6365270 \cdot 325314 \cdot 211660 \cdot 7712544 \cdot 28 \cdot 52 \cdot 6410032 \cdot 835141 \cdot 1197401 \cdot 7675382 \cdot 7675382 \cdot 7751264 \cdot 7875382 \cdot 7751264 \cdot 7875382 \cdot 7751264 \cdot 7875382 \cdot 7751264 \cdot 7875382 \cdot 7751264 \cdot 787514 \cdot 78751$	7712544	28 52	-6410032	835141	1.197401	7675382	80
-	6320293	.815580	1-226121	7749445	48	33/-6	3367513	835803	$\cdot 6320293 \cdot 815580 \cdot 1 \cdot 226121 \cdot 7749445 \cdot 48933 \cdot 6367513 \cdot 835803 \cdot 210942 \cdot 7710692 \cdot 2753 \cdot 6412264 \cdot 835635 \cdot 1 \cdot 196693 \cdot 7673517 \cdot 1 \cdot$	7710692	27 53	6412264	835635	1.196693	7673517	2
-	6322547	-816064	1.225393	-7747606	47	34 .6	3869756	826292	$\cdot 6322547 \cdot 816064 \cdot 1 \cdot 225393 \cdot 7747606 \cdot 47 \cdot 34 \cdot 6369756 \cdot 826292 \cdot 1 \cdot 210225 \cdot 7708840 \cdot 2654 \cdot 6414496 \cdot 836129 \cdot 1 \cdot 195986 \cdot 76716528 \cdot 7708840 \cdot 2654 \cdot 6414496 \cdot 836129 \cdot 1 \cdot 195986 \cdot 76716528 \cdot 7708840 \cdot 2654 \cdot 6414496 \cdot 836129 \cdot 770886 \cdot 76716528 \cdot 7708840 \cdot 2654 \cdot 6414496 \cdot 836129 \cdot 770886 \cdot 76716528 \cdot 7708840 \cdot 7671678 \cdot 7708840 \cdot 7671678 \cdot 7708840 \cdot 770884$	7708840	2654	-6414496	836129	1-195986	7671652	9
-	6324800	816549	1.224665	7745767	16	35 -6	8371998	826782	$ \cdot 6324800 \cdot 816549 \cdot 1 \cdot 224665 \cdot 7745767 \cdot 4635 \cdot 6271998 \cdot 826782 \cdot 1 \cdot 209508 \cdot 7706986 \cdot 2555 \cdot 6416728 \cdot 836624 \cdot 1 \cdot 195279 \cdot 7669785 \cdot 1 \cdot $	9869011	2555	6416728	836624	1-195279	7669785	5
-	6327053	-817034	1.223938	7743926	45	36 .6	3374240	827271	$\cdot 6327053 \cdot 817034 \cdot 1 \cdot 223938 \cdot 7743926 \cdot 45 \cdot 36 \cdot 6374240 \cdot 827271 \cdot 208792 \cdot 7705132 \cdot 24 \cdot 56 \cdot 6418958 \cdot 837118 \cdot 1 \cdot 194573 \cdot 7667918 \cdot 18888 \cdot 18888 \cdot 18888 \cdot 18888 \cdot 18888 \cdot 188888 \cdot 188888 \cdot 18888 \cdot 18888 \cdot 18888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 188888 \cdot 18888 \cdot 188888 \cdot 18888 \cdot 188888 \cdot 18888 \cdot 1888$	7705132	24 56	-6418958	837118	1-194573	8162997	4
-	5329306	817519	1.223212	7742086	44	37/16	3376481	827762	$ \cdot 6229306 \cdot 817519 \cdot 1 \cdot 223212 \cdot 7742086 \cdot 44 \cdot 37 \cdot 6376481 \cdot 827762 \cdot 1 \cdot 208076 \cdot 7703276 \cdot 23 \cdot 57 \cdot 6421189 \cdot 837613 \cdot 1 \cdot 193867 \cdot 766605 \cdot 7703276 \cdot 23 \cdot 57 \cdot 6421189 \cdot 837613 \cdot 1 \cdot 193867 \cdot 766605 \cdot 7703276 \cdot 23 \cdot 57 \cdot 6421189 \cdot 837613 \cdot 1 \cdot 193867 \cdot 766605 \cdot 7703276 \cdot 107676 \cdot $	7703278	2357	-6421189	837613	1-193867	1609997	9
~	6331557	818004	1-222486	-7740244	43	38 .6	3378721	828252	$\cdot 6331557 \cdot 818004 \cdot 1 \cdot 222486 \cdot 7740244 \cdot 43 \cdot 38 \cdot 6378721 \cdot 828252 \cdot 1 \cdot 207361 \cdot 7701423 \cdot 23 \cdot 58 \cdot 6423418 \cdot 838108 \cdot 1 \cdot 193162 \cdot 7664183 \cdot 638157 \cdot 818004 \cdot 1 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot $	7701423	22 58	1-6423418	838108	1.193162	7664183	C.S
-	6333809	818490	1.221761	7738402	12	39 1-6	1960888	828742	$8.6333809 \cdot 818490 \cdot 1.221761 \cdot 7738402 \cdot 4239 \cdot 6380961 \cdot 828742 \cdot 1.206646 \cdot 7699567 \cdot 2159 \cdot 6425647 \cdot 838604 \cdot 1.192457 \cdot 7662314 \cdot 788609 \cdot 818490 \cdot 81840 $	7699567	2159	6425647	838604	1-192457	7662314	-
9	5336059	818976	1-221036	19 ·6336059 ·818976 1·221036 ·7736559 41 20 ·6338310 ·819462 1·220312 ·7734716 40	41	10	3383201	829233	$\begin{array}{c} \textbf{19} \cdot \textbf{6336059} \cdot \textbf{818976} \mid \textbf{-221036} \cdot \textbf{7736559} \mid \textbf{41} \mid \textbf{40} \cdot \textbf{6383201} \cdot \textbf{829233} \mid \textbf{-205932} \cdot \textbf{7697710} \mid \textbf{20} \mid \textbf{60} \cdot \textbf{6427876} \cdot \textbf{639099} \mid \textbf{-1191753} \cdot \textbf{7660444} \\ \textbf{20} \cdot \textbf{6338310} \cdot \textbf{819462} \mid \textbf{-220312} \cdot \textbf{7734716} \mid \textbf{40} \\ \end{array}$.7697710	20 60	6427876	833033	1-191753	7660444.	0
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-	Cosina	Cosine, Cotang.	Tang.	Sine	,	1	/ / Cosine. Cotang.	Cotono	Tang	Sine	`	/ / Cosing. Cotang.	Cotoner	Thomas	Sino	-

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	Sine.	Tang.	Cotang.	Cosine.	,	Sine.	Tang.	Cotang.	Cosine,	,1,	Sine.	Tang.	Cotang. Cosine.	Cosine.	1
019846678801111111111111111111111111111111111	0.6427876 839099 1-191753 7666444 66 1.6430104 839595 1-191049 7658574 59 2.643252 840587 1-189643 7654822 57 3.6434013 841581 1-188239 7651087 55 5.6439011 841581 1-188239 7651087 55 6.644128 842578 1-188538 764734 15 7.6443461 842577 1-188537 764734 15 8.6445865 843073 1-188136 7645455 55 9.6447909 843570 1-185438 764734 15 11.6452555 844567 1-185438 764734 15 12.645577 84566 1-183438 7634204 46 13.645577 84566 1-183438 7634204 46 14.645919 84565 1-181944 7634204 46 15.646409 84565 1-181944 7634204 46 16.645019 84565 1-181944 7634204 46 16.64546 847051 1-18559 76364545 44 17.6456579 84566 1-18354 77633204 46 18.646788 848061 1-179159 76362683 42 19.6467898 848061 1-179159 7626683 42 19.647016 848561 1-17944 7624802 41	8339099 833595 841054 841054 841054 842078 843073 843570 844567 844567 845566 845663 845663 845663 845663 845663 845663 845663 845663 845663	1-191753 1-191049 1-1896345 1-1888941 1-188239 1-185339 1-186136 1-184737 1-184737 1-184737 1-181247 1-181247 1-181247 1-181247 1-181247 1-181247 1-181247 1-181247 1-181247 1-181247 1-181244 1-181247 1-181247 1-181247 1-181247 1-181247 1-181247 1-181247	7660444 7658574 7654832 7652960 7651087 7647340 7645465 7645466 7643590 7639838 7639838 7639838 7639838 7639838 7639838 763980 7639838 7638683 7638838 763883 76388 76	55 55 55 55 55 55 55 55 55 55 55 55 55	0.6427876 639909 1-191753 7660444 602 6476767 68064 1-176882 7619152 3842 652084 1-6320104 839595 1-191049 7658574 592 6476767 86064 1-176882 7619152 3842 652084 860135 1-156960 7581343 18 2.6432532 6434559 840687 1-186943 7652900 5625-648344 851066 1-17499 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7613497 7614187	849563 850064 851066 851066 852070 852077 853077 865307 865699 865699 866699 866699 866699 866699 866699 866699 866699 866699	1.177075 1.1756382 1.1756383 1.173612 1.173612 1.172920 1.172920 1.172920 1.170849 1.170849 1.1667407 1.166720 1.166720 1.166720 1.166737 1.166737 1.166737	7621036 7619152 7619152 7617268 761349 7609724 7609724 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 7602170 77598389	39 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	6518778 6520984 6523189 -6525394 -65320001 -6532001 -6534206 -6534001 -6540810 -6543010 -6543010 -6549607 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6551804 -6556198 -65605395 -65605396	**S59629** **S6013148** **S61148** **S61655* **S61659** **S6209** **S64700** **S65209**	1-163291 1-161923 1-161923 1-161924 1-16957 1-159574 1-158511 1-15749 1-15749 1-155789	7583240 -7579446 7579446 77571548 77571851 77568951 77568951 7756895 7756895 7756895 775693 775693 775643	113 113 114 115 115 115 115 115 115 115 115 115
0	Cosine.	Cosine. Cotang.	Tang.	Sine.	1	/ Cosine. Cotang. Tang.	Cotang.	Tang.	Sine.	1	/ Cosine. Cotang.	Cotang.	Tang.	Sine.	1.

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-	19	18	17	91	15	14	13	12	11	10	6	00	1	9	3	4	8	63	-	0	1-
Cosine.	7468317	7466382	7464446	7462510	7460574	7458636	7456699	7454760	7452821	7450881	7448941	7446999	7445058	7443115	7441173	7439229	7437285	7435340	7433394	7431448	Sine.
Cotang.	·6650131 ·890445 1·123032 ·7468317	$6562785 \cdot 869797 \cdot 1 \cdot 149692 \cdot 7545187 \cdot 5922 \cdot 6608754 \cdot 880585 \cdot 1 \cdot 135608 \cdot 7504957 \cdot 3842 \cdot 6652304 \cdot 890967 \cdot 1 \cdot 132375 \cdot 74663821 \cdot 188058 \cdot 1880$	$\bullet 564980 \cdot 870308 \cdot 1 \cdot 149017 \cdot 7543278 \cdot 5823 \cdot 6610936 \cdot 881101 \cdot 1 \cdot 134942 \cdot 7503034 \cdot 3743 \cdot 6654476 \cdot 891489 \cdot 1 \cdot 121718 \cdot 7464446 \cdot 746446 \cdot 7464446 \cdot 7464446 \cdot 746446 \cdot 7464446 \cdot 746446 \cdot 74646 \cdot 746446 \cdot 746446 \cdot 746446 \cdot 74646 \cdot 7466 \cdot 74666 \cdot 746$	1.121061 .7462510	1-120405 -7460574	$\cdot 6571560 \cdot 871843 \cdot 1 \cdot 146994 \cdot 7537546 \cdot 5526 \cdot 6617482 \cdot 882653 \cdot 1 \cdot 132947 \cdot 7497262 \cdot 3446 \cdot 6660987 \cdot 893056 \cdot 1 \cdot 119749 \cdot 7458636 \cdot 1 \cdot $	$\textbf{-6573752} \cdot 872355 \cdot 1 \cdot 146321 \cdot 7535634 \cdot 5427 \cdot 6619662 \cdot 883170 \cdot 1 \cdot 132283 \cdot 7495337 \cdot 3347 \cdot 6663156 \cdot 893579 \cdot 119094 \cdot 7456699 \cdot 745669$	$\cdot 6575944 \cdot 872868 \cdot 1 \cdot 145648 \cdot 7533721 \cdot 5328 \cdot 6621842 \cdot 883688 \cdot 1 \cdot 131620 \cdot 7493411 \cdot 3248 \cdot 6665325 \cdot 894103 \cdot 1 \cdot 118439 \cdot 7454760 \cdot 1 \cdot $	$\cdot 6578135 \cdot 873380 \cdot 1 \cdot 144976 \cdot 7531808 \cdot 5289 \cdot 6624022 \cdot 884206 \cdot 1 \cdot 130957 \cdot 7491484 \cdot 3149 \cdot 6667493 \cdot 894626 \cdot 1 \cdot 117784 \cdot 7452821 \cdot 1 \cdot$	$\cdot 6580326 \cdot 873893 \cdot 1 \cdot 144304 \cdot 7529894 \cdot 51 \cdot 30 \cdot 6626200 \cdot 884725 \cdot 1 \cdot 130294 \cdot 7489557 \cdot 30 \cdot 50 \cdot 6669661 \cdot 895150 \cdot 1 \cdot 17130 \cdot 7450881 \cdot 7489587 \cdot 7489557 \cdot 7489557 \cdot 7489557 \cdot 7489557 \cdot 7489557 \cdot 7489557 \cdot 748957 \cdot $	6671828 895674 1-116476 -744894	$1.6584706 \\ \cdot 874920 \\ 1 \cdot 142961 \\ \cdot 7526065 \\ \cdot 4932 \\ \cdot 6530557 \\ \cdot 885763 \\ \cdot 1428970 \\ \cdot 7485701 \\ \cdot 28576 \\ \cdot 8970 \\ \cdot 7485701 \\ \cdot 88578 \\ \cdot 896199 \\ \cdot 89619$	$12^{\circ}6586895^{\circ}875433 \\ 11 \cdot 142290^{\circ}7524149 \\ 14833^{\circ}632734^{\circ}886282 \\ 11 \cdot 128308^{\circ}7483772 \\ 27 \\ 53^{\circ}6576160^{\circ}896723 \\ 11 \cdot 15170^{\circ}7445058 \\ 27 \\ 27 \\ 27 \\ 27 \\ 27 \\ 27 \\ 27 \\ 2$	13.6589083.8759471.141620.75222334734.6634910.8868011.127647.748184226[54.6678326].897248[1.114518.7443115]	1.126987 77479912 25 55 6680490 897773 1.113866 7441173	1.126327 7477981 24 56 6682655 898299 1.113214 7439229	1-125667 -7476049 23 57 -6684818 -898825 1-112563 -7437285	$1.76597831 \cdot 878006 \cdot 1 \cdot 138944 \cdot 7514561 \cdot 4338 \cdot 6643612 \cdot 888882 \cdot 1 \cdot 125008 \cdot 7474117 \cdot 2258 \cdot 6686981 \cdot 899351 \cdot 1111912 \cdot 7435340 \cdot 122508 \cdot 12250$	$18.6600017 \cdot 8755211 \cdot 138276 \cdot 751264 \cdot 14239 \cdot 6645785 \cdot 889403 \cdot 1 \cdot 124349 \cdot 7472184 \cdot 2159 \cdot 6689144 \cdot 899877 \cdot 1 \cdot 111262 \cdot 7433394 \cdot 1200000000000000000000000000000000000$	$\begin{array}{c} \textbf{19} \cdot \textbf{6602202} \cdot \textbf{879037} \ \textbf{1\cdot137608} \cdot \textbf{7510721} \ \textbf{41} \ \textbf{40} \cdot \textbf{6647959} \cdot \textbf{889924} \ \textbf{1\cdot123690} \cdot \textbf{7470251} \ \textbf{20} \ \textbf{60} \cdot \textbf{6691306} \cdot \textbf{900404} \ \textbf{1\cdot110612} \cdot \textbf{7431448} \\ \textbf{20} \cdot \textbf{6604386} \cdot \textbf{879552} \ \textbf{1\cdot136941} \cdot \textbf{7508800} \ \textbf{40} \end{array}$	Tang.
Tang.	890445	196068	891489		892534	-893056	893579	894103	894626	895150	895674	896199	896723	897248	897773	898299	898825	198668	899877	-900404	Cotang.
Sine.	6650131	6652304	6654475	6656646	6658817	2860999	6663156	6665325	6667493	19969999	6671828	6673994	6676160	6678326	6680490	6682655	6684818	1869899	6689144	6691306	' Cosine. Cotang.
,	41	42	43	44	45	46	47	48	4.9	20	51	25	53	54	55	99	57	58	59	09	1
,	39	38	37	36	35	34	33	35	31	30	29	28	27	26	35	24	23	22	21	20	1
Cosine.	7506879	7504957	7503034	7501111	7499187	7497262	7495337	7493411	7491484	7489557	7487629	7485701	7483772	7481842	7479912	7477981	7476049	7474117	7472184	7470251	Sine.
Cotang.	·6606570 ·880068 1-136274 ·7506879 3941	135608	134845	1-134277	1133612	1.132947	132283	131620	130957	130294	6628379 -885244 1-129632 -7487629 29 51	026821	1.128308	1.127647	1.126987	1126327	125667	1.125008	1-124349	1.123690	Tang.
Tang.	880068	880585	881101	881618	882135	882653	883170	883688	884206	884725 1	885244	885763	886282	886801	-			888888	889403	889924	Cotang.
Sine.	0759099	6608754	9860199	61118199	6615300	6617482	2996199	6621842	6624022	6626200	6628379	6630557	6632734	6634910	6637087	6639262	6641437	6643612	6645785	6647959	/ Cosine. Cotang.
,	21	22	23	24	. 92	. 92	27	88	- 62	30		35	33	34	35	36	37	88	39	40	1-
	9	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	25	41	1
Cosine.	.7547096	7545187	.7543278	-7541368	7539457	.7537546	·7535634	7533721	7531808	.7529894	.7527980	-7526065	7524149	.7522233	7520316	7518398	.7516480	7514561	7512641	7510721	Sine.
Cotang. Cosine.	1.150368	149692	1149017	1-148342	147668	146994	1.146321	1.145648	1.144976	1144304	143632	142961	1.142290	1-141620	140950	140281	1.139612	1.138944	1.138276	1-137608	Tang.
Tang.	869286	162698	8000018	870820	871331	871843	872355	872868	873380	873893	874406	874920	875433	875947	876462	976978	877491	900878	878521	879037	Cotang. Tang.
Sine.	-6560590 -869286 1-150368 -7547096 60 21	6562785	6564980	$ \cdot 6567174 \cdot 870820 \cdot 1 \cdot 148342 \cdot 7541368 \cdot 5724 \cdot 6613119 \cdot 881618 \cdot 1 \cdot 134277 \cdot 7501111 \cdot 3644 \cdot 6656646 \cdot 892011 \cdot 3644 \cdot 892011 \cdot 3644 \cdot 6656646 \cdot 892011 \cdot 3644 \cdot 6656646 \cdot 892011 \cdot 3644 \cdot 6656646 \cdot 892011 \cdot 3644 \cdot 666666 \cdot 892011 \cdot 3644 \cdot 892011 \cdot 3644 \cdot 892011 \cdot 3644 \cdot 892011 \cdot 3644 \cdot 66666 \cdot 892011 \cdot 3644 \cdot 892011 $	$\textbf{-6569367} \cdot 871331 \cdot 1 \cdot 147668 \cdot 7539457 \cdot 66256 \cdot 6615300 \cdot 882135 \cdot 1 \cdot 133612 \cdot 7499187 \cdot 3545 \cdot 6658817 \cdot 892534 \cdot 656987 \cdot 7896187 \cdot 789$.6571560	6573752	6575944	6578135	6580326	0.6582516 874406 1-143632 -7527980 50 31	6584706	6586895	6589083	14 -6591271 -876462 1-140950 -7520316 46 35 -6637087 -887321	5 6593458 876976 1.140281 7518398 45 36 6639262 887841	6 6595645 877491 1.139612 7516480 44 37 6641437 888361	6597831	6600017	19 -6602202 -879037 1-137608 -7510721 41 20 -6604386 -879552 1-136941 -7508800 40	Cosine.
-	0	-	C.S	8	4	10	9	1	00	6	01	=	65	9	7	2	9	17	8	60	1.

43 Deg.

NATURAL SINES AND TANGE

42 Deg.

. 1	19	180	14	16	15	14	13	Č\$	=	0	6	00	7	9	2	4	3	¢5	7	0	1.
Cosine.	.084322 -7351118 19	1.083689 -7349146 18	083057 -7347173 17	-082425 -7345199 16	$-6699948 \cdot 902513 \cdot 108017 \cdot 7423658 \cdot 5628 \cdot 6745172 \cdot 913659 \cdot 1 \cdot 094500 \cdot 7382592 \cdot 3545 \cdot 6788007 \cdot 924390 \cdot 1 \cdot 081793 \cdot 734325 \cdot 15 \cdot 15 \cdot 108179 \cdot 108179 \cdot 108179 \cdot 108179 \cdot 1081799 \cdot 10$	$\cdot 6702108 \cdot 903041 \cdot 1.07369 \cdot 7421708 \cdot 55 \cdot 26 \cdot 6747319 \cdot 914192 \cdot 1.093861 \cdot 7380629 \cdot 3446 \cdot 6790143 \cdot 924930 \cdot 1.081162 \cdot 7341250 \cdot 146 $	7339275 13	7337299 12	7335322	7333345	7331367	7329388	7327409	7325429	7323449	7321467	7319486	7317503	7315521	7313537	Sine.
Cotang.		1.083689	1.083057	1-082425	1.081793	1-081162	1-080532	1.079901	1.079271	-6798681 927091 1.078642	1-078013	1.090034 7368842 2852 6802946 928173 1.077384 7329388	1-076756 -7327409	1.076128 -7325429	1.075500 -7323449	1.074873 -7321467	1-074246 -7319486	1-073620 -7317503	1-072994 -7315521	-932515 1-072368 -7313537	Tang.
Tang.	922236	-922773	923312	923851	-924390	924930	-925470	926010	.926550	160726	927632	928173	928715	929257	929799	930342	930884	931428	931971	932515	Cotano.
Sine.	6779459 922235	6781597 -922773	6783734 923312 1	-6785871 -923851	1008819	6790143	6792278 925470 1	6794413	1.091946 7374738 3149 6796547 926550 1.079271	6798681	1-090671 -7370808 29 51 -6800813 -927632 1	6802946	089398 7366875 2753 6805078 928715	·088762 ·7364908 2654 ·6807209 ·929257	088126 7362940 2555 6809339 929799 1	6811469	6813599	1.086222 7357032 2258 6815728 931428	6817856	6819984	Cosine. Cotang.
	41	42	43		45	46	47	48	49	20	19	52	53	54	55	99	57	- 89	-169	. 09	1-
	5/39	38	137	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	1
Cosine.	-739043	096420 7388475 3842	1 095779 -7386515 3743	1-095139 7384553 3644	7382592	-7380629	-7378666	-7376703	·7374738	.7372773	·7370808	7368842	·7366875	7364908	7362940	7360971	7359002	7357032	7355061	7353090	Sine
Cotang.	1-097060	_	1-095779	1.095139	1.094500	198860-1	1.093222	1.092584	1.091946	1-091308 7372773 3050	179060-1	1-090034	868680-1	1.088762	.088126	1087491	-086857	-086222	-085588	-084955	Tang
Tang.	911526	912059	-912592	913125	913659	914192	914727	915261		916331	998916	917402	917937	918474	010616	919547	920084		921159	9316961	Totang
Sine.	-6691308 -900404 1-110612 -7431448 6021 -6736577 -911526 1-097060 -7390435 3941	-6693468 -900930 1-109963 -7429502 5922 -6738727 -912059	•6695628 901458 1-109314 7427554 5823 6740876 912592 1	-6697789 901985 1.108665 7425606 57 24 6743024 913125 1	6745172	6747319	$\cdot 6704266 \cdot 903569 \cdot 1 \cdot 106721 \cdot 7419758 \cdot 5427 \cdot 6749466 \cdot 914727 \cdot 1 \cdot 093222 \cdot 7378666 \cdot 3347$	1.106075 -7417808 5328 6751612 915261 1.092584 7376703 3248 6794413 926010	52 29 6753757 915796	905155 1-104782 -7413905 51 30 -6755902 -916331	6758046 -916866	·6715051 ·906214 1·103491 ·7410000 4932 ·6760190 ·917402	·6717206 ·906744 1 · 102846 · 7408046 48 33 · 6762333 · 917937	6764476 918474	·6721515 ·907805 1·101557 ·7404137 46 35 ·6766618 ·919010	·6768760 ·919547 1·087491 ·7360971 2456 ·6811469 ·930342	·6770901 ·920084 1 · 086857 · 7359002 2357 · 6813599 · 930884	6773041 920621	-6730125 -909930 11-098985 -7396311.4239 -6775181 -921159 11-085588 -7355061 (2159 -6817856 -931971	$ \begin{array}{c} 1.038343 \\ 7392394 \\ 40 \end{array} , \\ 7392394 \\ 40 \end{array} , \\ 6777320 \\ \cdot 921696 \\ 1.084955 \\ \cdot 7353090 \\ 20 \\ 60 \\ \cdot 6819984 \\ 0 \end{array} $	Cosine. Cotang
,	55	22	23	24	55	38	27	88	53	30		35	33	34	35	36	37	38	39	40	1-
	09	59	58	57	99	55	54	53	52	51	50	49	48	47	46	4536	44	43	42	41	1.
Cosine.	-7431448	-7429502	-7427554	.7425606	.7423658	-7421708	-7419758	-7417808	-7415857	-7413905	·7411953	.7410000	·7408046	7406092	7404137	7402181	7400225	7398268	7396311	7394353	Sine
Cotang.	1-110612	1-109963	1.109314	1.108665	1.108017	1-107369	1-106721	1-106075	1.105428	1-104782	1-104136	1.103491	102846	102201	101557	100914	100270	839660	1986860	1-098343 -7394353	Tane.
Tang.	-900404	-900930	901458	-901985	902513	-903041	-903569	904097	904626	905155	905685	906214	906744	907274	907805	908336	1 298806	909398	9099301		Cotamo
Sine.	6691306	6693468	6695628	687789	6699948	6702108	6704266	6706424	·6708582 ·904626 1·105428 ·7415857	-6710739	0 -6712895 -905685 1-104136 -7411953 5031	6715051	6717206	6719361 907274 1.102201,7406092 4734	3721515	6723668 908336 1.100914 7402181	·6725821 ·908867 1·100270 ·7400225 44	·6727973 ·909398 1 · 099628 · 7398268 43 38	3730125	6732276 -910461 -6734427 -910994	Cosine.
	•	-	65	9		-	-	-				*	25	3	*	5	9	Ŧ	7	9 9	1

Deg. 46.

Deg. 16.

NATURAL SINES AND TANGENTS TO A RADIUS 1.

43 Deg.

1.068623 | 7301623 | 54|27.6877213 | 947307 | 1.055623 | 7259748 | 3347 | 6919332 | 958407 | 1.043397 | 7219615 | 1388607 | 7219815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | 7319815 | $\cdot 6830613 \cdot 935238 \cdot 1069246 \cdot 7303610 \cdot 5526 \cdot 6875101 \cdot 946755 \cdot 1056238 \cdot 7261748 \cdot 3446 \cdot 6917232 \cdot 957849 \cdot 1044005 \cdot 7221628 \cdot 7261748 \cdot 3446 \cdot 6917232 \cdot 957849 \cdot 1044005 \cdot 7221628 \cdot 7261748 \cdot 3446 \cdot 7261748 $1.067377 | \cdot 7297646 | 52| 29| \cdot 6881435 | \cdot 948411 | 1 \cdot 054394 | \cdot 7255746 | 31| 49| \cdot 6923531 | \cdot 959524 | 1 \cdot 042183 | \cdot 7215589 | \cdot 7215689 | \cdot$ Cosine. 045222 7225651 $1.066755 \cdot 7295657 \cdot 51 \cdot 130 \cdot 6883546 \cdot 948964 \cdot 1.053780 \cdot 7253744 \cdot 30 \cdot 50 \cdot 6925630 \cdot 960082 \cdot 1.041576 \cdot 7213574 \cdot 100 \cdot 10$ 1.040970 7211559 56 6938209 963442 1.037944 7201476 57 -6940304 -964003 1-037340 -7199457 58 6942398 964565 1.036736 7197438 1.048270 7235698 2159 6944491 965126 1.036133 7195418 0.047659 7233690 20 60 6946584 965688 1 035530 7193398 -040364 -7209544 039758 -7207528 039153-7205511 Sine. .038548 Cotang. Tang. 955620 1 $0 \cdot 6841229 \cdot 937968 \cdot 1 \cdot 666134 \cdot 7293668 \cdot 50 \cdot 31 \cdot 6885655 \cdot 949517 \cdot 1 \cdot 053166 \cdot 7251741 \cdot 29 \cdot 51 \cdot 6927728 \cdot 960642 \cdot 1368 \cdot$ 43 -6910927 -956177 Cotang. -955064 24 6870875 945653 1.057470 7265747 3644 6913029 956734 1.056854 .7263748[35]45 -6915131 -957291 54 6934018 962321 1.050715 7243724 25 55, 6936114 962881 Tang. 53 6931922 961761 1.058703 .7269743 3842 .6908824 Cosine. Sine. 1.059320 -7271740 3941 7 1 1-051327 -7245729 26 1.062411 | 7281716 | 44 | 37 | 6898302 | 952842 | 1.049492 | 7239712 | 23 17 6856066 941803 1.061792 7279722 43 38 6900407 953397 1.048880 7237705 22 1.051940 7247734 27 .063031 7283710 45 86 6896195 952287 11.050103 7241719 24 Cosine. Sine. Cotang. Tang. 1.063651 7285703 4635 6894089 951732 6864532 944001 -6828489 934692 1-069870 7305597 5625 6872988 946204 18 6858184 942352 1.061174 7277728 42 39 6902512 953952 1.060556 7275732 41 40 6904617 954508 Tang. ·6822111 ·933059 1·071743 ·7311553 59 22 ·6866647 ·944551 1-064891 -7289686 48 33 -6889873 -950624 13 6847591 939610 1.064271 7287695 47 34 6891981 951178 / I / Cosine. |Cotang. Sine. 43 Deg. 932515 1.072368 7313537 6021 6826363 934147 1-070494 7307583 57 Cosine. Sine. Cotang. Tang. 6832738 935783 6836984 936875 6845471 939062 15-6851830|-940706 14 6849711 940157 Tang. 9 6839107 937421 16 6853948 941254 19 6860300 942901 Cosine, |Cotang. -6819984 Sine.

NATURAL SINES AND TANGENTS TO A RADIUS 1. 44 Deg. 44 Deg. 44 Deg.

Tang. Cotang. Cosine.		$ \begin{array}{c} \textbf{0.6946584} \cdot \textbf{965688} \cdot \textbf{1.025530} \cdot \textbf{7193398} \cdot \textbf{6021} \cdot \textbf{6990396} \cdot \textbf{977564} \cdot \textbf{1.022950} \cdot \textbf{7150830} \cdot \textbf{3941} \cdot \textbf{7031879} \cdot \textbf{989006} \cdot \textbf{1.01115} \cdot \textbf{7110041} \cdot \textbf{199000} \cdot \textbf{1990000} \cdot \textbf{199000} \cdot \textbf{199000} \cdot \textbf{199000} \cdot \textbf{199000} \cdot \textbf{199000} \cdot \textbf{199000} \cdot \textbf{1990000} \cdot \textbf{19900000} \cdot \textbf{1990000} \cdot \textbf{1990000} \cdot \textbf{1990000} \cdot \textbf{1990000} \cdot \textbf{19900000} \cdot \textbf{199000000} \cdot \textbf{199000000} \cdot \textbf{199000000} \cdot \textbf{199000000} \cdot \textbf{1990000000} \cdot \textbf{1990000000} \cdot \textbf{19900000000} \cdot \textbf{1990000000} \cdot \textbf{1990000000} \cdot \textbf{199000000000000} \cdot $	6946684 -965688 1-035530 7193398 6021 6990396 977564 1-022950 7150830 3941 7031879 989006 1-011115 7110041 19 6948676 968251 1-034927 7191377 5922 6992476 978133 1-022355 77148796 3842 7033947 989582 1-010527 7107995 18	6946684 -965688 1-035530 -7193398 6021 -6990396 -977564 1-022550 -7150830 3941 -7031879 -989006 1-011115 -7110041 19 -6946876 -966251 1-034927 -7191377 5922 -6992476 -978133 1-022355 -7148796 3842 -7033947 -989582 1-010527 -7107995 18 -6950767 -966813 1-034325 -7189355 5823 -6994555 -978702 1-021760 -7146762 3743 -7035014 -990158 1-009939 -7105948 17	11115 7110041 19 10527 7107995 18 09939 710594817 09352 7103901 16	6946584 -965688 1-035530 7193398 6021 -6990396 977564 1-022350 7150830 3941 7031879 989006 1-011115 7110041 19 6948676 -966251 1-034927 7191377 5922 -6992476 -978133 1-022355 7148796 3842 7033947 -989582 1-010527 7107996 18 6950767 -966813 1-034225 7189355 5823 -6994555 -978702 1-021760 7146762 3743 7036014 -990158 1-009393 7105948 17 6952858 -967376 1-033723 -7187333 5724 -6996633 -979272 1-021166 7144727 3644 -7038081 -990734 1-009352 7103901 16 69548689 -967936 1-033122 -7185310 5625 -6998711 -979842 1-020572 7142691 3545 7040147 -991311 1-008764 -7101854 15	$ \begin{array}{c} \textbf{-6946584} \cdot \textbf{965688} & \textbf{1-035530} \cdot \textbf{71933398} & \textbf{6021} \cdot \textbf{6990396} \cdot \textbf{977564} & \textbf{1-022350} \cdot \textbf{7150830} & \textbf{3941} \cdot \textbf{7031879} \cdot \textbf{989006} & \textbf{1-01115} \cdot \textbf{7110041} & \textbf{19} \\ \textbf{-6948676} \cdot \textbf{966251} & \textbf{1-034927} \cdot \textbf{7191377} & \textbf{5922} \cdot \textbf{6992476} \cdot \textbf{978133} & \textbf{1-022355} \cdot \textbf{7148796} & \textbf{3842} \cdot \textbf{7033947} \cdot \textbf{989582} & \textbf{1-010527} \cdot \textbf{77107995} & \textbf{18} \\ \textbf{-6950767} \cdot \textbf{-668131} & \textbf{1-034325} \cdot \textbf{7189355} & \textbf{5724} \cdot \textbf{-6994555} & \textbf{-9787021} & \textbf{1-021760} \cdot \textbf{77146762} & \textbf{3743} \cdot \textbf{7038004} \cdot \textbf{-990734} & \textbf{1-009933} \cdot \textbf{77105996} & \textbf{18} \\ \textbf{-6954399} \cdot \textbf{-679391} & \textbf{-67937021} & \textbf{-679277} & \textbf{-67021166} \cdot \textbf{7714727} & \textbf{3644} \cdot \textbf{7038004} & \textbf{-990734} & \textbf{-9099527} & \textbf{-7010390116} \\ \textbf{-6954399} \cdot \textbf{-679391} & \textbf{-703122} \cdot \textbf{7185391} & \textbf{562570} & \textbf{-70103901147} & \textbf{-9913111} & \textbf{-009744} \cdot \textbf{7010890116} \\ \textbf{-6964399} \cdot \textbf{-679391} & \textbf{-6793761} & \textbf{-670391} & \textbf{-7080147} & \textbf{-9913111} & \textbf{-008764} \cdot \textbf{7010890116} \\ \textbf{-696439978} \cdot \textbf{-708053122} & \textbf{-7081282375837} & \textbf{-7082018} & \textbf{-991311} & \textbf{-008764} & \textbf{-7080080116} \\ \textbf{-996421} \cdot \textbf{-9904241} & \textbf{-9909622111} & \textbf{-0199787} & \textbf{-708053122} & \textbf{-991311} & \textbf{-008764} & \textbf{-70800806} & \textbf{-9913122} \\ \textbf{-996439978} \cdot \textbf{-99623122} & \textbf{-991311} & \textbf{-0087678} & \textbf{-70808188} & \textbf{-008178} & \textbf{-7080081} \\ \textbf{-996439978} \cdot \textbf{-996232123} & \textbf{-9913111} & \textbf{-008764} & \textbf{-7080081} \\ \textbf{-996439978} \cdot \textbf{-9913111} & \textbf{-008764} & \textbf{-7080081} & \textbf{-9913111} \\ \textbf{-996842} \cdot \textbf{-9909628} & \textbf{-991311} & \textbf{-09913122} & \textbf{-9913111} \\ \textbf{-9964221} \cdot \textbf{-9909622122} & \textbf{-9913111} & \textbf{-09096222} & \textbf{-9913111} \\ \textbf{-9964221} \cdot \textbf{-9909622122} & \textbf{-9913111} & \textbf{-9913111} \\ \textbf{-9964221} \cdot \textbf{-9913111} & \textbf{-9913111} & \textbf{-9913111} \\ \textbf{-9964221} \cdot \textbf{-9913111} & \textbf{-9913111} & \textbf{-9913111} \\ \textbf{-996422122} \cdot \textbf{-9913111} & \textbf{-9913111} & \textbf{-9913111} \\ -9964221222212222122221222122212222222222$	6946584 -965688 1-035530 71933398 6021 -6990396 977564 1-022350 7150830 3941 7031879 598066 1-01115 7110041 19 6948676 -966251 1-034927 7191377 5922 -6992476 -978138 1-022355 7148796 3842 7033947 -989582 1-010527 77107995 18 6950767 966813 1-034325 7189355 5823 -6994555 -978702 1-021760 7714727 3644 7036014 -990158 1-009933 77105948 17 6952868 967376 1-033723 7187336 5724 -699633 -97872 1-021166 7744727 3644 708081 -990734 1-008742 7103901 16 6954949 967399 1-033122 77183387 526 7000779 -989412 1-019978 714655 3445 77040147 -991311 1-08764 7108540 16 6956939 -98633 -98633 -97872 1-021146 744727 744127 744127 -991311 1-08764 7709986 14 6957939 -68630 -92526 7000779 -980412 1-019978 7128618 3347 7041278 -992465 1-008775 13	$ \begin{array}{c} \textbf{6946684} \cdot \textbf{965688} & \textbf{1-035530} & \textbf{71933398} & \textbf{6021} \cdot \textbf{6990396} \cdot \textbf{977564} & \textbf{1-022350} \cdot \textbf{7150830} & \textbf{39411} \cdot \textbf{7031879} \cdot \textbf{989006} & \textbf{1-011115} \cdot \textbf{7110041} & \textbf{119} \\ \textbf{6948676} \cdot \textbf{966251} & \textbf{1-034927} \cdot \textbf{7191377} & \textbf{5922} \cdot \textbf{6992476} \cdot \textbf{978133} & \textbf{1-022355} \cdot \textbf{7148796} & \textbf{3842} \cdot \textbf{7033947} \cdot \textbf{989582} & \textbf{1-010527} \cdot \textbf{7107995} & \textbf{1889676} & \textbf{988676} & \textbf{9896813} & \textbf{1-0234876} & \textbf{1-021066} & \textbf{1-021066} & \textbf{1-021066} & \textbf{1-022076} & \textbf{1-0220767} & \textbf{1-02202076} & \textbf{1-0220767} & \textbf{1-0220276} & \textbf{1-022020276} & \textbf{1-0220276} & 1$	10027 710041 19 10527 7107995 18 09939 7105948 17 09352 7103901 16 08764 7101854 15 07591 7099806 14 07591 7099767 13 07691 7093767 12	111115 7110041 19 10527 7107995 18 09352 7105948 17 09352 7101891 16 08764 7101891 16 08776 7099806 14 07591 7097757 13 067005 70995707 12 06384 7709167 10										
	1-011115 -711004		1-010527 -710799	1-010527 -710799	$ \begin{array}{c} \textbf{6948676} & \textbf{966251} & \textbf{1-034927} & \textbf{7191377} & \textbf{5922} & \textbf{6992476} & \textbf{978133} & \textbf{1-022356} & \textbf{7148796} & \textbf{3842} & \textbf{7033947} & \textbf{989582} & \textbf{1-010527} & \textbf{7107996} \\ \textbf{6950767} & \textbf{-966813} & \textbf{1-034325} & \textbf{7189355} & \textbf{5823} & \textbf{6994555} & \textbf{978702} & \textbf{1-021760} & \textbf{7146762} & \textbf{3743} & \textbf{7036014} & \textbf{990158} & \textbf{1-009939} & \textbf{7105948} \\ \textbf{6962858} & \textbf{-967376} & \textbf{1-033723} & \textbf{7187333} & \textbf{5724} & \textbf{6996633} & \textbf{979272} & \textbf{1-021166} & \textbf{7144727} & \textbf{3644} & \textbf{-7038081} & \textbf{990734} & \textbf{1-0099352} & \textbf{7103901} \\ \end{array} $	1-010527 710799 1-00939 710594 1-009352 710390 1-008764 710181	1-009939 -710799 1-009352 -710390 1-008764 -710187 1-008178 -710187	1-010527 -710799 1-009939 -710594 1-009352 -710394 1-008764 -710185 1-008178 -709984	1-010527 7.10799 1-009938 7.10694 1-008764 7.10188 1-008178 7.0998 1-007591 7.09771 1-007705 7.09574	$ \begin{array}{c} \textbf{6.948676} \ \ \textbf{9.66251} \ \ \textbf{1.034927} \ \ \textbf{7.191377} \ \ \textbf{5.922} \ \ \textbf{6.992476} \ \ \textbf{9.78133} \ \ \textbf{1.022355} \ \ \textbf{7.146796} \ \ \textbf{3.842} \ \ \textbf{7.033947} \ \textbf{9.99582} \ \ \textbf{1.010527} \ \ \textbf{7.107996} \\ \textbf{6.950767} \ \ \textbf{-966813} \ \ \textbf{1.024325} \ \ \textbf{7.189355} \ \ \textbf{5.823} \ \ \textbf{-6.994655} \ \ \textbf{-9.78702} \ \ \textbf{1.021766} \ \ \textbf{7.144727} \ \ \textbf{3.644} \ \ \textbf{-7.036014} \ \textbf{-9.991018} \ \ \textbf{1.009939} \ \ \textbf{7.105948} \\ \textbf{6.952868} \ \ \textbf{-967372} \ \ \textbf{1.021166} \ \ \textbf{7.144727} \ \ \textbf{3.644} \ \ \textbf{-7.038081} \ \ \textbf{-9.991311} \ \ \textbf{1.009339} \ \ \textbf{7.105948} \\ \textbf{6.956439} \ \ \textbf{-6.95220} \ \ \textbf{7.702866} \ \ \textbf{-9.98042} \ \ \textbf{1.018978} \ \ \textbf{-7.14655} \ \ \textbf{3.446} \ \ \textbf{-7.042213} \ \ \textbf{-9.91381} \ \ \textbf{1.003919} \ \ \textbf{-7.002866} \ \ \textbf{-9.98042} \ \ \textbf{1.018978} \ \ \textbf{-7.138618} \ \ \textbf{3.3446} \ \ \textbf{-7.042213} \ \ \textbf{-9.91381} \ \ \textbf{-7.007095} \ \ \textbf{-7.002866} \ \ \textbf{-9.980942} \ \ \textbf{-1.018978} \ \ \textbf{-7.138618} \ \ \textbf{3.1448} \ \ \textbf{-7.044278} \ \ \textbf{-9.92465} \ \ \textbf{-0.07059} \ \ \textbf{-7.093657} \ \ \textbf{-9.993657} \ \ \textbf{-7.00366} \ \ \textbf{-9.99392} \ \ \textbf{-7.0044278} \ \ \textbf{-9.92465} \ \ \textbf{-7.007065} \ \ \textbf{-7.093657} \ \ \textbf{-9.007018} \ \ \textbf{-7.0044278} \ \ \textbf{-9.92465} \ \ \textbf{-7.007065} \ \ \textbf{-7.00366} \ \ \textbf{-9.99392} \ \ \textbf{-7.007066} \ \ \textbf{-9.99362} \ \ \textbf{-7.007066} \ \ \textbf{-9.99362} \ \ \textbf{-7.007066} \ \ \textbf{-9.99362} \ \ \textbf{-7.007065} \ \ \textbf{-7.00266} \ \ \textbf{-9.99362} \ \ \textbf{-7.007065} \ \ \textbf{-7.00266} \ \ \textbf{-9.99362} \ \ \textbf{-7.007065} \ \ \textbf{-7.00266} \ \ \textbf{-9.99362} \ \ \textbf{-7.007065} \ \ \textbf{-7.00266} \ \ \textbf{-9.99362} \ \ \textbf{-7.007069} \ \ \textbf{-7.00266} \ \ \textbf{-9.00706} \ \ \textbf{-7.00266} \ \ \textbf{-7.002620} \ \ \textbf{-7.00266} \ \ \textbf{-7.00266} \ \ \textbf{-7.00266} \ \ \textbf{-7.002620} \ \ \textbf{-7.00266} \ \ \textbf{-7.00266} \ \ \textbf{-7.00266} \ \ \textbf{-7.002620} \ \ \textbf{-7.00266} \ \ -7.00$	1.6948676 968251 1.034927 7191377 5922 6992476 978133 1.022355 7148796 3842 7033947 7105938 7105948 2.6950767 966813 1.034325 77189355 5823 6994555 978702 1.021766 7146762 3743 7036014 990158 1.009939 7105948 3.6952868 967376 1.033723 7187333 5724 6996633 979272 1.021166 7144727 3644 7038081 990734 1.009952 7103901 4.69549 967339 1.033122 718733 5625 6998711 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